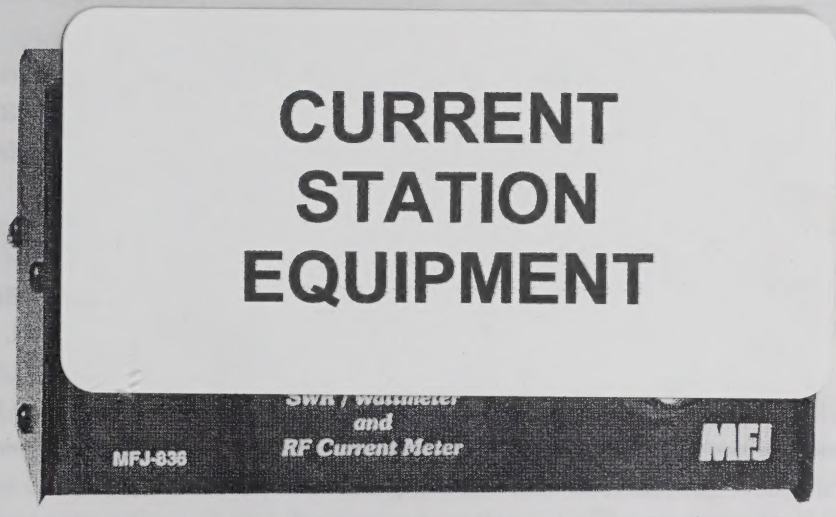
MFJ

SWR/Wattmeter and RF Ammeter

Model MFJ-836



CURRENT STATION EQUIPMENT

INSTRUCTION MANUAL

CAUTION: Read All Instructions Before Operating Equipment

MFJ ENTERPRISES, INC.

300 Industrial Park Road
Starkville, MS 39759 USA
Tel: 662-323-5869 Fax: 662-323-6551

ERSION 1A

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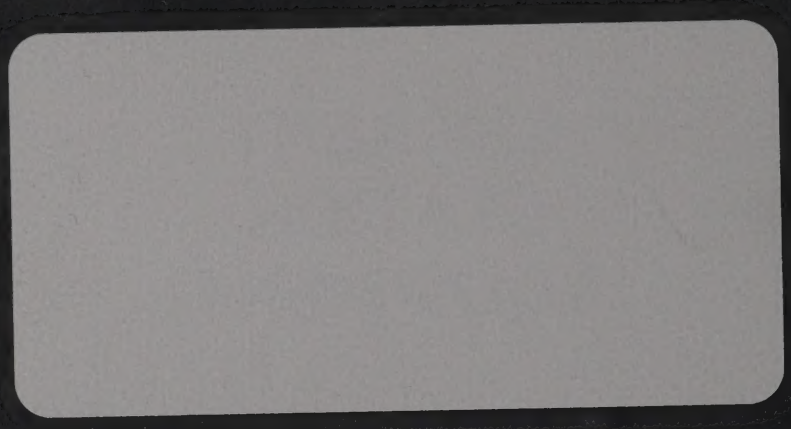

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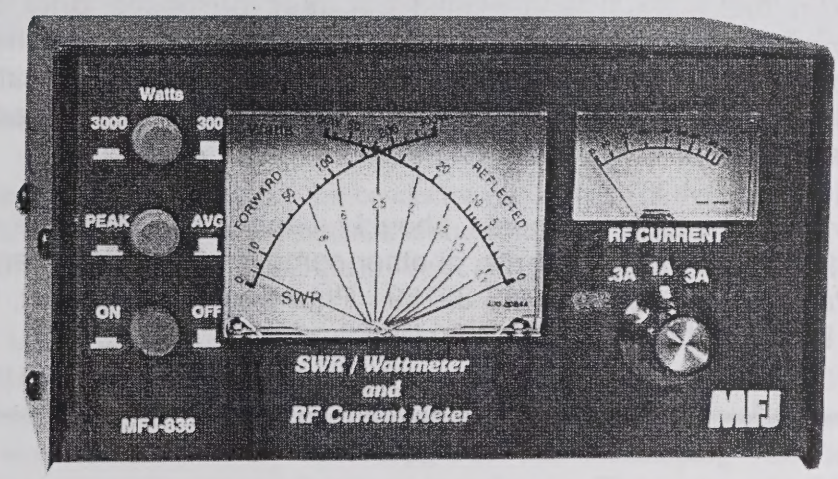

INSTRUCTION MANUAL

CAUTION: Read All Instructions Before Operating Equipment

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DISCLAIMER

Information in this manual is designed for **user purposes only** and is ***not*** intended to supersede information contained in customer regulations, technical manuals/documents, positional handbooks, or other official publications. The copy of this manual provided to the customer will ***not*** be updated to reflect current data.

Customers using this manual should report errors or omissions, recommendations for improvements, or other comments to MFJ Enterprises, 300 Industrial Park Road, Starkville, MS 39759. Phone: (662) 323-5869; FAX: (662) 323-6551. Business hours: M-F 8-4:30 CST.

MFJ-836 SWR/Wattmeter and RF Ammeter

Introduction

The MFJ-836 is an all-in-one true peak reading SWR/Wattmeter with a built in RF Ammeter designed to operate on 1.8-30 MHz. The SWR/Wattmeter uses our *TrueActive* ™ peak reading circuit to read true peak/average forward and reflected power and SWR simultaneously. It has 3000/300 Watts forward and 600/60 Watts reflected power scales. The SWR/Wattmeter utilizes a large illuminated three-inch Cross-Needle meter to read the SWR from 1:1 to ∞. The RF Ammeter measures RF feedline current in three calibrated ranges: 0.3 Amperes, 1 Ampere, and 3 Amperes.

IMPORTANT:

Please read entire manual before attempting to operate this equipment. This unit does not provide a dc or low frequency earth ground. A separate wire should be connected from the station ground bus to an electric ground. Do not place any non-coaxial feed wires near metallic or RF sensitive devices.

Installation

1. Connect your transmitter to the connector on the back of the unit labeled TRANSMITTER and your antenna to the connector labeled ANTENNA. It is important that you use good quality coax and properly installed connectors.

2. The MFJ-836 has a *TrueActive* ™ peak reading circuit included the SWR/Wattmeter that requires a DC power supply such as the MFJ-1312B in order to function. A 9 VDC may also be installed inside the meter with a battery clip that is included. The rear panel accepts a 2.1 mm coaxial plug with the center conductor positive (+) and the sleeve negative (-). The negative lead is grounded inside the meter. There is no need to disconnect the battery when using external power. The RF Ammeter does not require power to operate.

3. An internal lamp backlights the SWR/Wattmeter scale. The lamp circuit requires 12 VDC and will not illuminate with the 9 VDC battery alone.

4. To measure the power output capability of a transmitter/amplifier you should connect a quality 50-ohm dummy load to the ANTENNA connector of the MFJ-836.

NOTE:

The SWR/Wattmeter must have a power source in order to function. A nine-volt battery may be installed in the compartment on the rear panel, or an external 12 VDC source, such as the optional MFJ-1312D power supply, may be used.

Operation

1. With the DC power supply or 9 VDC battery installed, push the **ON/OFF** button **in** to turn the unit ON. If 12 VDC is used, the SWR/Wattmeter backlight will also be turned ON.

2. The SWR/Wattmeter's full-scale forward and reflected power range is controlled by the **3000/300-Watt** button. When the button is pushed **in**, the forward power scale is on 3000 Watts and the reflected power scale is on 600 Watts. When the button is pushed **out**, the forward power scale is on 300 Watts and the reflected power scale is on 60 Watts. If your transmitter/amplifier runs more than 300 Watts of output power, push the button **in** for 3000 Watts. If your transmitter runs less than 300 Watts of output power, push the button **out** for 300 Watts.

3. Average power is measured when the **PEAK/AVG** button is pushed **out.** Peak envelope power (PEP) is measured when the **PEAK/AVG** button is pushed **in**. Peak and average power values are equal with steady unmodulated carriers, FSK, or FM. The meter reading on these modes will be the same whether the **PEAK/AVG** button is pushed **in** or **out.** On SSB, the PEP meter reading should be twice the average power with two-tone test modulation. On SSB, the ratio of PEP to average power varies with different voice characteristics. With most voices, the PEP reading is three to five times higher than the average voice power reading. The most accurate PEP readings are obtained only with sustained carrier, voice or two-tone test modulation. During normal voice modulation, the wattmeter will typically indicate only 70% of the true Peak Envelope Power.

4. Forward power is displayed on the left-hand FORWARD meter scale. This scale is calibrated from 0 to 300 Watts and is read directly in the **300W (out)** position. Each picket (scale mark) represents 5 Watts below 10 Watts, 10 Watts between 10 and 100 Watts, and 25 Watts between 100 and 300 Watts. In the **3000W (in)** position, the forward power scale must be multiplied by 10. Each picket represents 50 Watts below 100 Watts, 100 Watts from 100 to 1000 Watts, and 250 Watts from 1000 to 3000 Watts.

5. The reflected power is read on the right-hand REFLECTED meter scale. Reflected power is 60-Watts full scale when the **300W (out)** power scale is selected, and 600-Watts full scale when the **3000W (in)** power scale is selected.

6. The most accurate power readings occur in the upper half of the meter scales. When trying to measure power with a less than perfect match, the reflected power should be subtracted from the forward power reading in order to find the true power.

7. The SWR is read directly from nine red SWR curves that range from 1:1 to ∞. SWR is measured by observing the point where the forward and reflected power

needles cross. The SWR is indicated by the red curve closest to the needle crossing point.

8. The RF Ammeter measures RF current in three calibrated ranges: 0.3 Amperes, 1 Ampere, and 3 Amperes. Simply turn the Current Range knob to the desired range.

9. The meter is scaled from 0 to 100. On the 100-mA range, readout is direct (100 = 100 mA). On the 1-A range, move the decimal point 2 places to the left (100 = 1.00 A). To convert meter readings made on the 30 mA, 300 mA, and 3-A ranges, multiply accordingly. For example, a reading of 85 on the 300-mA range equals 300 x .85, or 255 mA. See Table 1 below to estimate readings quickly.

10. To prevent meter pegging, begin checks on a high range and work down. To estimate unknown current levels, use the formula below (I = Unknown Current in Amps, P = Applied Power in Watts, and R = Load Resistance in Ohms).

$$I = \sqrt{\frac{P}{R}}$$

	Range		
Meter	300 mA	1 A	3 A
10	30	0.1	0.3
20	60	0.2	0.6
30	90	0.3	0.9
40	120	0.4	1.2
50	150	0.5	1.5
60	180	0.6	1.8
70	210	0.7	2.1
80	240	0.8	2.4
90	270	0.9	2.7
100	300	1.0	3.0

Table 1: Actual Current Value

RF Hazard--Important Warnings:

1. RF-current measurements must be conducted with extreme caution. Physical contact with conductors carrying even moderate RF-energy levels can result in severe RF burns, or injury.
2. Avoid measuring RF currents on conductors where high RF voltages may be present (>500 Volts). Damage to your meter may result.

Calibration

Both the MFJ-836 SWR/Wattmeter section and RF Ammeter sections have been calibrated at the factory. If the SWR/Wattmeter or RF Ammeter should ever need to be recalibrated, then follow this procedure:

Equipment Needed

1. Transmitter capable of supplying enough power to obtain ½ to full-scale reading at 14 or 21 MHz.
2. 50-ohm dummy load that is capable of handling full transmitter output power and has better than a 1.15:1 SWR.
3. Power meter of know accuracy. The calibration will only be as good as the standard reference meter.
4. 50-ohm cables capable of handling the power. RG-58/u is recommended. DO NOT USE RG-59 or RG-11.

SWR/Wattmeter Calibration

1. Refer to *Figure 1* for the Test Setup and refer to the PCB layout in *Figure 2* for trim pot location.
2. Remove the top of the MFJ-836.
3. Connect the Test Setup equipment as shown in *Figure 1*. Use a 50-ohm dummy load for the antenna. Set the Transmitter to the 14 MHz in the 20-meter band.
4. With the **3000/300-Watts** button pushed **out** for the 300-Watt scale, Transmit 100 Watts as indicated on the reference meter. Adjust the LO FWD trim pot to set the forward power scale to 100 Watts.
5. With the **3000/300-Watts** button pushed **in** for the 3000-Watt scale, Transmit 1000 Watts as indicated on the reference meter. Adjust the HI FWD trim pot to set the forward power scale to 1000 Watts.
6. To set the reflected power, interchange the TRANSMITTER and ANTENNA coax cables so that the transmitter is connected to the ANTENNA connector and the dummy load is connected to the TRANSMITTER connector.
7. With the **3000/300-Watts** button pushed **out** for the 60 Watt reflected scale, Transmit 10 Watts as indicated on the reference meter. Adjust the LO REF trim pot to set the reflected power scale to 10 Watts.

SWR/Wattmeter Calibration (cont.)

8. With the **3000/300-Watts** button pushed **in** for the 600 Watt reflected scale, Transmit 100 Watts as indicated on the reference meter. Adjust the HI REF trim pot to set the reflected power scale to 100 Watts.

9. SWR requires no calibration.

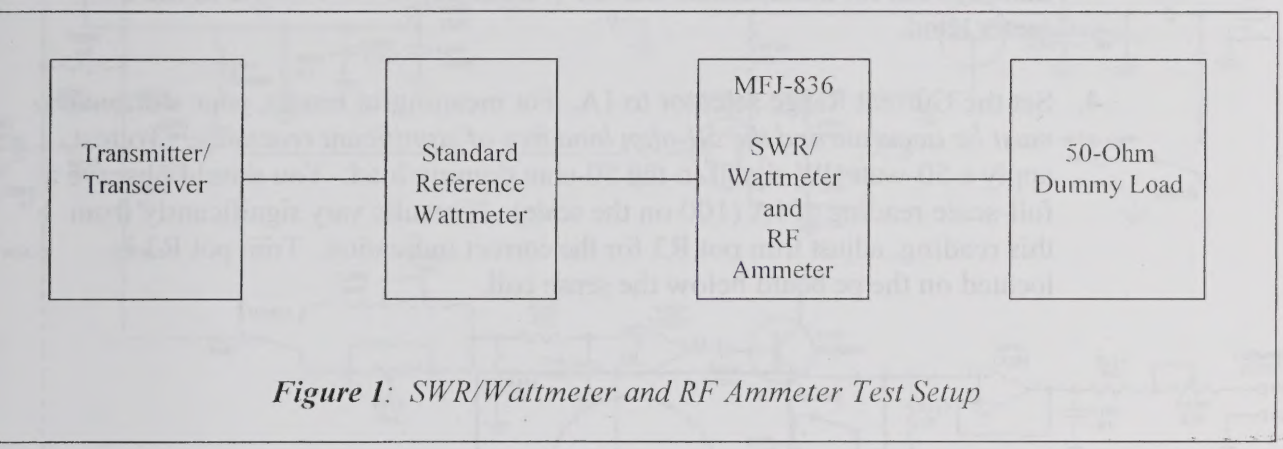


***Figure 1**: SWR/Wattmeter and RF Ammeter Test Setup*

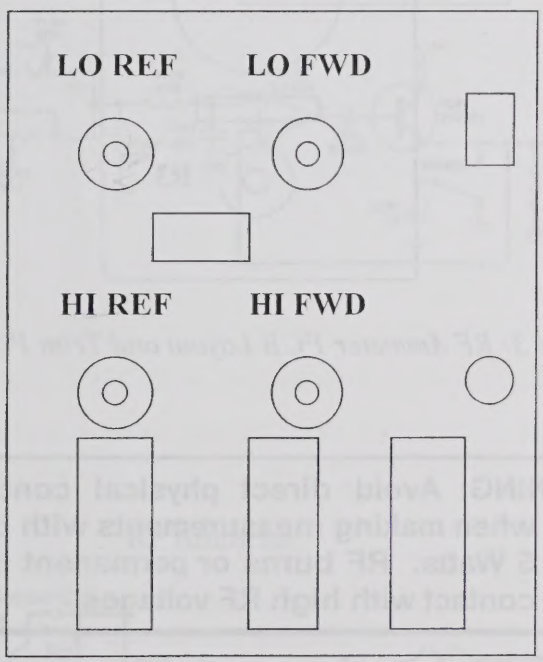


***Figure 2**: SWR/Wattmeter PCB Layout and Trim Pot Location*

RF Ammeter Calibration

1. Refer to *Figure 1* for the Test Setup and refer to the PCB layout in *Figure 3* for trim pot location.

2. Remove the top of the MFJ-836.

3. Connect the Test Setup equipment as shown in *Figure 1*. Use a 50-ohm dummy load for the antenna. Set the Transmitter to the 14 MHz in the 20-meter band.

4. Set the Current Range selector to 1A. For meaningful results, *your wattmeter must be accurate and the 50-ohm load free of significant reactance.* To test, apply a 50-watt CW signal to the 50-ohm dummy load. You should observe a full-scale reading of 1A (100 on the scale). If results vary significantly from this reading, adjust trim pot R3 for the correct indication. Trim pot R3 is located on the pc board below the sense coil.

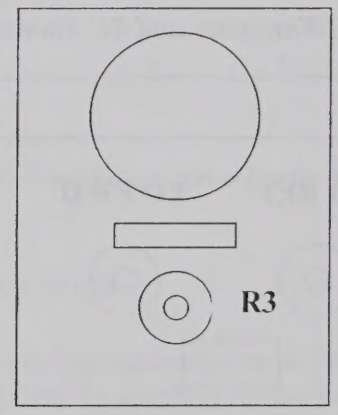


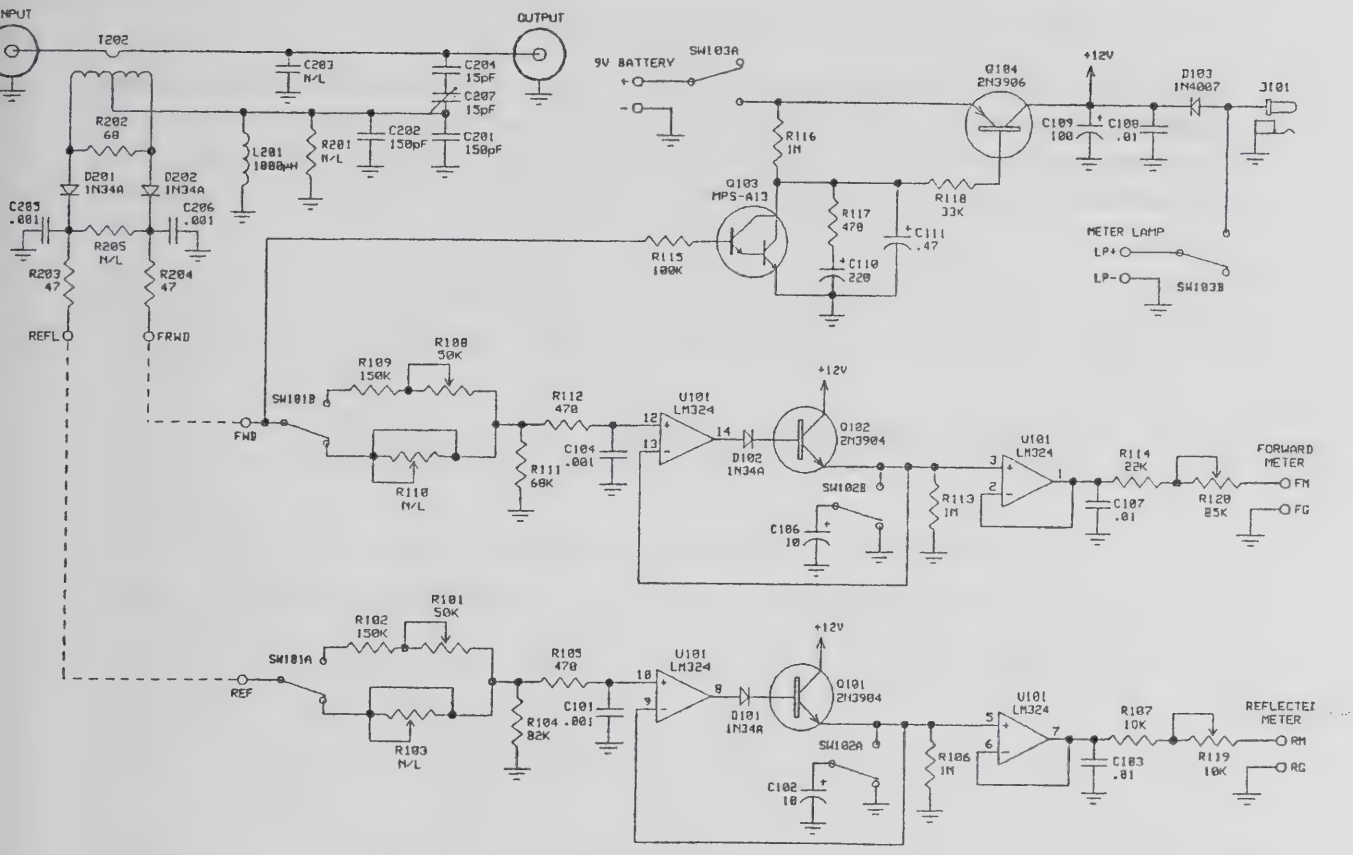
***Figure 3**: RF Ammeter PCB Layout and Trim Pot Location*

IMPORTANT WARNING: Avoid direct physical contact with this device when making measurements with power sources of over 5 Watts. RF burns or permanent injury may result from contact with high RF voltages.

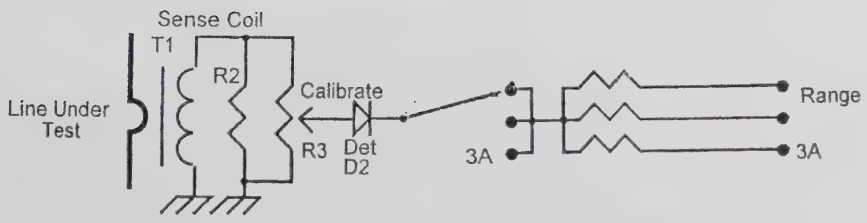
If your meter is out of calibration and you lack the equipment or skills to perform the calibration procedure, you may return it to the MFJ factory for service.

Schematic

SWR/Wattmeter



RF Ammeter



Technical Assistance

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or reading the manual does not solve your problem, you may call *MFJ Technical Service* at **662-323-0549** or the *MFJ Factory* at **662-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759; by Facsimile (FAX) to 662-323-6551; or by email to techinfo@mfjenterprises.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

LIMITED 12 MONTH WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free from defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, canceled check, credit card or money order receipt, etc.) describing the product to establish the validity of the warranty claim and submit the original or machine reproduction of such proof of purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery shall be cause to void any and all warranty terms immediately.

2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product under warrantee provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashiers check, or money order for **$7.00** covering postage and handling.

3. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling the Service Department at 662-323-0549 or the MFJ Factory at 662-323-5869.

4. This warranty does not apply to kits sold by or manufactured by MFJ Enterprises, Inc.

5. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board product is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, or cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.

6. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ products.

7. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.

8. This warranty is given in lieu of any other warranty expressed or implied.

9. MFJ Enterprises, Inc. reserves the right to make changes or improvements in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.

10. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to:

    MFJ Enterprises, Inc.,
    300 Industrial Park Road
    Starkville, Mississippi 39759 USA

    and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.

11. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

MFJ

MFJ ENTERPRISES, INC.
300 Industrial Park Road
Starkville, MS 39759

MFJ-836 Mar
Version
Printed In U.S

MFJ-836 SWR/Wattmeter and RF Ammeter

Introduction

The MFJ-836 is an all-in-one true peak reading SWR/Wattmeter with a built in RF Ammeter designed to operate on 1.8-30 MHz. The SWR/Wattmeter uses our *TrueActive™* peak reading circuit to read true peak/average forward and reflected power and SWR simultaneously. It has 3000/300 Watts forward and 600/60 Watts reflected power scales. The SWR/Wattmeter utilizes a large illuminated three-inch Cross-Needle meter to read the SWR from 1:1 to ∞. The RF Ammeter measures RF feedline current in three calibrated ranges: 0.3 Amperes, 1 Ampere, and 3 Amperes.

IMPORTANT:

Please read entire manual before attempting to operate this equipment. This unit does not provide a dc or low frequency earth ground. A separate wire should be connected from the station ground bus to an electric ground. Do not place any non-coaxial feed wires near metallic or RF sensitive devices.

Installation

1. Connect your transmitter to the connector on the back of the unit labeled TRANSMITTER and your antenna to the connector labeled ANTENNA. It is important that you use good quality coax and properly installed connectors.

2. The MFJ-836 has a *TrueActive™* peak reading circuit included the SWR/Wattmeter that requires a DC power supply such as the MFJ-1312B in order to function. A 9 VDC may also be installed inside the meter with a battery clip that is included. The rear panel accepts a 2.1 mm coaxial plug with the center conductor positive (+) and the sleeve negative (-). The negative lead is grounded inside the meter. There is no need to disconnect the battery when using external power. The RF Ammeter does not require power to operate.

3. An internal lamp backlights the SWR/Wattmeter scale. The lamp circuit requires 12 VDC and will not illuminate with the 9 VDC battery alone.

4. To measure the power output capability of a transmitter/amplifier you should connect a quality 50-ohm dummy load to the ANTENNA connector of the MFJ-836.

NOTE:
The SWR/Wattmeter must have a power source in order to function. A nine-volt battery may be installed in the compartment on the rear panel, or an external 12 VDC source, such as the optional MFJ-1312D power supply, may be used.

Operation

1. With the DC power supply or 9 VDC battery installed, push the **ON/OFF** button **in** to turn the unit ON. If 12 VDC is used, the SWR/Wattmeter backlight will also be turned ON.

2. The SWR/Wattmeter's full-scale forward and reflected power range is controlled by the **3000/300-Watt** button. When the button is pushed **in**, the forward power scale is on 3000 Watts and the reflected power scale is on 600 Watts. When the button is pushed **out**, the forward power scale is on 300 Watts and the reflected power scale is on 60 Watts. If your transmitter/amplifier runs more than 300 Watts of output power, push the button **in** for 3000 Watts. If your transmitter runs less than 300 Watts of output power, push the button **out** for 300 Watts.

3. Average power is measured when the **PEAK/AVG** button is pushed **out.** Peak envelope power (PEP) is measured when the **PEAK/AVG** button is pushed **in**. Peak and average power values are equal with steady unmodulated carriers, FSK, or FM. The meter reading on these modes will be the same whether the **PEAK/AVG** button is pushed **in** or **out.** On SSB, the PEP meter reading should be twice the average power with two-tone test modulation. On SSB, the ratio of PEP to average power varies with different voice characteristics. With most voices, the PEP reading is three to five times higher than the average voice power reading. The most accurate PEP readings are obtained only with sustained carrier, voice or two-tone test modulation. During normal voice modulation, the wattmeter will typically indicate only 70% of the true Peak Envelope Power.

4. Forward power is displayed on the left-hand FORWARD meter scale. This scale is calibrated from 0 to 300 Watts and is read directly in the **300W (out)** position. Each picket (scale mark) represents 5 Watts below 10 Watts, 10 Watts between 10 and 100 Watts, and 25 Watts between 100 and 300 Watts. In the **3000W (in)** position, the forward power scale must be multiplied by 10. Each picket represents 50 Watts below 100 Watts, 100 Watts from 100 to 1000 Watts, and 250 Watts from 1000 to 3000 Watts.

5. The reflected power is read on the right-hand REFLECTED meter scale. Reflected power is 60-Watts full scale when the **300W (out)** power scale is selected, and 600-Watts full scale when the **3000W (in)** power scale is selected.

6. The most accurate power readings occur in the upper half of the meter scales. When trying to measure power with a less than perfect match, the reflected power should be subtracted from the forward power reading in order to find the true power.

7. The SWR is read directly from nine red SWR curves that range from 1:1 to ∞. SWR is measured by observing the point where the forward and reflected power

needles cross. The SWR is indicated by the red curve closest to the needle crossing point.

8. The RF Ammeter measures RF current in three calibrated ranges: 0.3 Amperes, 1 Ampere, and 3 Amperes. Simply turn the Current Range knob to the desired range.

9. The meter is scaled from 0 to 100. On the 100-mA range, readout is direct (100 = 100 mA). On the 1-A range, move the decimal point 2 places to the left (100 = 1.00 A). To convert meter readings made on the 30 mA, 300 mA, and 3-A ranges, multiply accordingly. For example, a reading of 85 on the 300-mA range equals 300 x .85, or 255 mA. See Table 1 below to estimate readings quickly.

10. To prevent meter pegging, begin checks on a high range and work down. To estimate unknown current levels, use the formula below (I = Unknown Current in Amps, P = Applied Power in Watts, and R = Load Resistance in Ohms).

$$I = \sqrt{\frac{P}{R}}$$

	Range		
Meter	**300 mA**	**1 A**	**3 A**
10	30	0.1	0.3
20	60	0.2	0.6
30	90	0.3	0.9
40	120	0.4	1.2
50	150	0.5	1.5
60	180	0.6	1.8
70	210	0.7	2.1
80	240	0.8	2.4
90	270	0.9	2.7
100	300	1.0	3.0

Table 1: Actual Current Value

RF Hazard--Important Warnings:

1. RF-current measurements must be conducted with extreme caution. Physical contact with conductors carrying even moderate RF-energy levels can result in severe RF burns, or injury.
2. Avoid measuring RF currents on conductors where high RF voltages may be present (>500 Volts). Damage to your meter may result.

Calibration

Both the MFJ-836 SWR/Wattmeter section and RF Ammeter sections have been calibrated at the factory. If the SWR/Wattmeter or RF Ammeter should ever need to be recalibrated, then follow this procedure:

Equipment Needed

1. Transmitter capable of supplying enough power to obtain ½ to full-scale reading at 14 or 21 MHz.

2. 50-ohm dummy load that is capable of handling full transmitter output power and has better than a 1.15:1 SWR.

3. Power meter of know accuracy. The calibration will only be as good as the standard reference meter.

4. 50-ohm cables capable of handling the power. RG-58/u is recommended. DO NOT USE RG-59 or RG-11.

SWR/Wattmeter Calibration

1. Refer to *Figure 1* for the Test Setup and refer to the PCB layout in *Figure 2* for trim pot location.

2. Remove the top of the MFJ-836.

3. Connect the Test Setup equipment as shown in *Figure 1*. Use a 50-ohm dummy load for the antenna. Set the Transmitter to the 14 MHz in the 20-meter band.

4. With the **3000/300-Watts** button pushed **out** for the 300-Watt scale, Transmit 100 Watts as indicated on the reference meter. Adjust the LO FWD trim pot to set the forward power scale to 100 Watts.

5. With the **3000/300-Watts** button pushed **in** for the 3000-Watt scale, Transmit 1000 Watts as indicated on the reference meter. Adjust the HI FWD trim pot to set the forward power scale to 1000 Watts.

6. To set the reflected power, interchange the TRANSMITTER and ANTENNA coax cables so that the transmitter is connected to the ANTENNA connector and the dummy load is connected to the TRANSMITTER connector.

7. With the **3000/300-Watts** button pushed **out** for the 60 Watt reflected scale, Transmit 10 Watts as indicated on the reference meter. Adjust the LO REF trim pot to set the reflected power scale to 10 Watts.

SWR/Wattmeter Calibration (cont.)

8. With the **3000/300-Watts** button pushed **in** for the 600 Watt reflected scale, Transmit 100 Watts as indicated on the reference meter. Adjust the HI REF trim pot to set the reflected power scale to 100 Watts.

9. SWR requires no calibration.

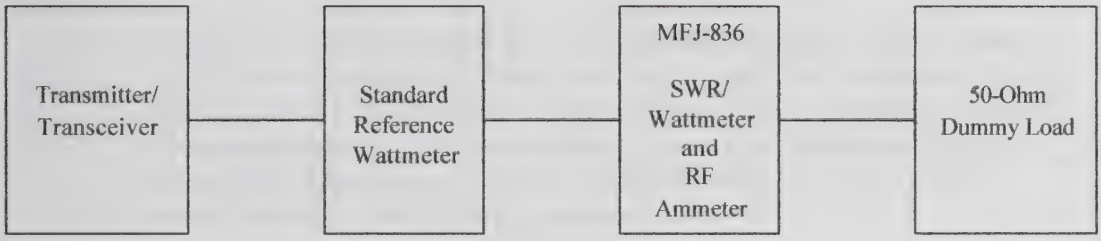


***Figure 1**: SWR/Wattmeter and RF Ammeter Test Setup*

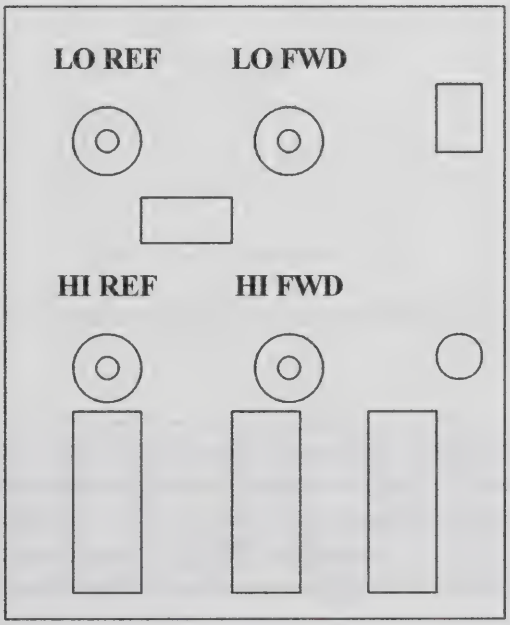


***Figure 2**: SWR/Wattmeter PCB Layout and Trim Pot Location*

RF Ammeter Calibration

1. Refer to *Figure 1* for the Test Setup and refer to the PCB layout in *Figure 3* for trim pot location.

2. Remove the top of the MFJ-836.

3. Connect the Test Setup equipment as shown in *Figure 1*. Use a 50-ohm dummy load for the antenna. Set the Transmitter to the 14 MHz in the 20-meter band.

4. Set the Current Range selector to 1A. For meaningful results, *your wattmeter must be accurate and the 50-ohm load free of significant reactance.* To test, apply a 50-watt CW signal to the 50-ohm dummy load. You should observe a full-scale reading of 1A (100 on the scale). If results vary significantly from this reading, adjust trim pot R3 for the correct indication. Trim pot R3 is located on the pc board below the sense coil.

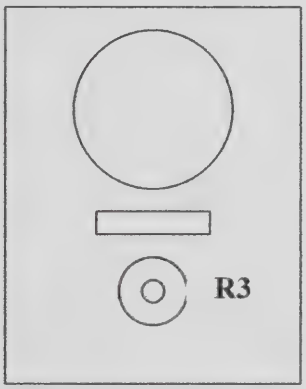


***Figure 3**: RF Ammeter PCB Layout and Trim Pot Location*

IMPORTANT WARNING: Avoid direct physical contact with this device when making measurements with power sources of over 5 Watts. RF burns or permanent injury may result from contact with high RF voltages.

If your meter is out of calibration and you lack the equipment or skills to perform the calibration procedure, you may return it to the MFJ factory for service.

Schematic

Technical Assistance

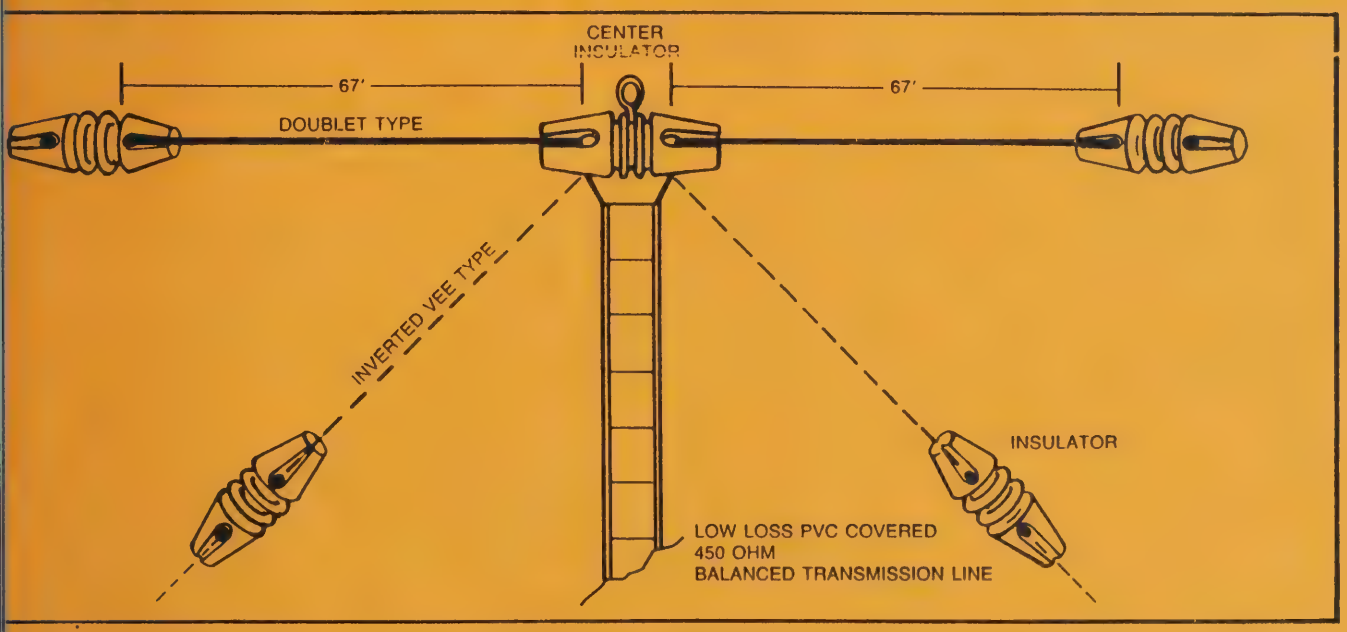
If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or reading the manual does not solve your problem, you may call *MFJ Technical Service* at **662-323-0549** or the *MFJ Factory* at **662-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759; by Facsimile (FAX) to 662-323-6551; or by email to techinfo@mfjenterprises.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

he ALL-BANDER Dipole

The Perfect Match For YOUR Antenna Tuner

ONLY **$29.95**



ll-Bander Dipole — A Perfect Match For Antenna Tuners With A Balanced Output

TURES:

- **mpletely factory assembled ready to use**
- **avy 14 (7/22) gauge stranded copper antenna wire to survive those severe rms that bring down lesser antennas**
- **nter fed with 100 feet of low loss PVC covered 450 ohm balanced nsmission line**
- **cludes center insulator with an eye hook for center support**
- **cludes custom molded insulators molded of top quality material with high electric qualities and excellent weatherability**
- **mplete installation instructions included**
- **verall length 135 feet, less when erected as an invested vee or sloper**
- **ndles 2 kw PEP and covers 160 through 10 meters including the w WARC bands**
- **ay be trimmed to fit small city lots**

Available At Your Dealer, If Not Order Direct From:

Van Gorden Engineering, P.O. Box 21305, South Euclid, Ohio 44121

The ALL-BANDER DIPOLE is designed specifically for the amateur who uses an antenna tuner. It is a high performance antenna tuner dipole that can be used with any tuner which provides for a balanced feedline output.

The antenna comes completely assembled and is ready for installation at your location. Before unwinding the antenna elements, decide where you are going to suspend the antenna. Overall length is 135' so at least 140' should be available when being installed in a dipole configuration. Less space is required when installing the antenna as an inverted vee or as a sloper type antenna. Space required to erect the antenna as an inverted vee or sloper type antenna will vary depending circumstance at your location. The antenna may be trimmed to fit your location in the event you don't have enough room to erect the antenna. When trimming the antenna, the element on each side of the center insulator must be trimmed equally in order to maintain balanced elements.

When installing the antenna, keep the ends of the antenna at least two feet away from metal down spouts, gutters, metal roofs and other sizable metal objects. The antenna should be erected in the clear as much as possible in order for the ends to not pick up any stray coupling with conductive objects.The antenna can be suspended between two buildings, two trees or a building and a tree. Always leave a slight sag in the antenna. Performance will not be affected by the sag and will keep the antenna from being under constant strain. If the antenna is suspended between two trees, allow enough sag to compensate for the trees swaying during high winds.

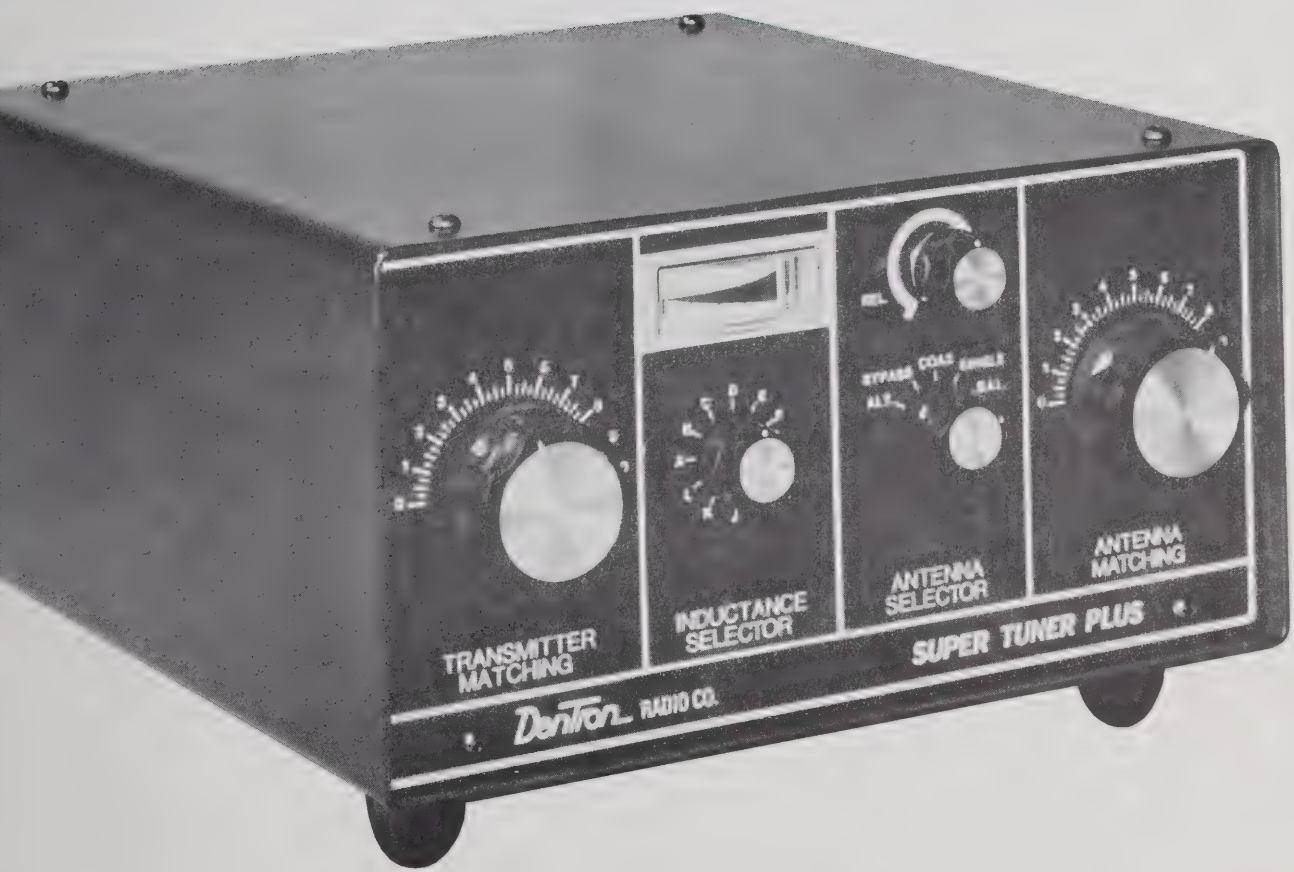
Once you have decided where to erect your antenna, carefully uncoil the antenna elements and balanced feedline. Attach the required lengths of nylon support rope to the insulators at each end of the antenna and hoist the antenna into position. Run the balanced feedline at a 90 degree angle away from the antenna for as great a distance as possible. Do not run the feedline over any metal objects such as a gutter or an aluminum window frame.

Extreme care should be exercised to insure the antenna and feedline are kept away from power lines. DO NOT ERECT THE ANTENNA OR PLACE THE FEEDLINE EITHER OVER OR UNDER OR IN THE VICINITY OF POWER LINES. Unusual ice or wind conditions, falling objects, or the collapse of support could cause breakage of the antenna, feedline or power line. Power lines or antennas can fall or be blown against each other which may cause property damage, personal injury or even death. It is the responsibility of the user to make sure that he places his antenna in a position where it can not fall or be blown against power lines.

Operating Manual
Super Tuner Plus

DenTron

0 = MAX. CAPACITANCE
BOTH CONTROLS



DenTron 160-10 Super Tuner Plus 1 kw

Introduction

The Super Tuner Plus is everything the famous DenTron Super Tuner is, and more! The Plus inclu a front panel forward relative power meter, and a built-in front panel antenna switch that handles up to f antennas.

When properly adjusted, the Super Tuner Plus will tune out load reactance and transform the load pedance to 50-70 ohms. A heavy duty 2 core balun is included, so antennas fed with open wire (balanc feedline may be properly tuned to the desired operating frequency.

Single wire, balanced feed, and coax cable fed antenna systems can be used with the Super Tuner P although everything from bedsprings to raingutters and downspouts have been successfully used by DenT tuner owners. The unit allows front panel switching of your antennas, plus tuner bypass. Another ante selector switch position allows for permanent installation of a dummy load, such as the DenTron Dummy, and when used with a VSWR meter lacking dual metering, you can measure both forward and flected power at the same time.

Power handling capability of the Super Tuner Plus is 1 KW CW and 1200 Watts PEP SSB (b measured in DC input to the final amplifier). The unit is compact but rugged, in an all-metal tigh shielded cabinet and weighs in at less than 15 pounds.

Theory of Operation

When one installs an antenna system of any type, a complex load may exist at the input end of the feed line. Depending on the frequency in use and the feedline length, this load can be a very high or very low impedance, or somewhere in between. The DenTron Super Tuner Plus is designed to match these wide variations to your normal 50 ohm transmitter/receiver impedance, and thus give you maximum efficiency in both transmit and receive modes.

It is important to remember that nothing will compensate for coaxial feed line loss when it is terminated with something other than its normal impedance. In other words, a severe mismatch at the antenna end of a 50 ohm feedline can be tuned out at the other end of the line, but you still have some degree of loss in the coax, and if it is high enough, the results can be inefficiency in both the transmit and receive functions. The Super Tuner Plus, however, will overcome any ill effect on your transmitting/receiving equipment, since it will see the nominal 50 ohm load offered by the tuner.

Remember, the closer your antenna system is to a fundamental or harmonic resonance, the better it will perform. The Super Tuner Plus gives you that big degree of flexibility required to put all of your power where it does the most good.

Unpacking Instructions

Carefully remove your Super Tuner Plus from its packing carton, making sure there is no damage evident from shipping. If there is any damage, notify the delivering shipper immediately, fully describing the damage.

Fully complete the DenTron Registration card included in the information package and return it to DenTron. Do not destroy the packing material, since it will be usable later on should you require factory service or need to transport the tuner for any other reason.

Installation

1. Connect a good earth ground to the ground terminal on the tuner's rear panel. A ground stake or rod is preferred, but a short, heavy wire clamped to a cold water pipe will usually suffice, if all connections are clean. It is most important to make your ground lead of the heaviest wire available and to use the shortest length possible between the ground point and tuner. Be sure to run an extension of the ground lead from your tuner to all other station equipment, especially your transmitter and linear amplifier.

   SEE BILL ORR'S HANDBOOK FOR MORE INFORMATION ON EARTH GROUNDING.

2. Connect your antennas to the appropriate output terminals on the rear panel.

   Bal. Out for balanced (or ladder) line feed.
   Coax Out for 50 or 70 ohm coax cable.
   Wire Out for long wire or random length antennas
   Alt. Out for secondary coaxial antenna or dummy load, such as the DenTron Big Dummy.
   This position is not tuneable.

3. Connect, if available, an SWR Bridge or Wattmeter (such as the DenTron W-2) between your exciter output and the tuner input connector on the rear panel, using quality 50 ohm coaxial cable. Be certain, in all cases, to solder the coax cable shield to the connector in making interconnecting or antenna lead-in cables. See Diagram 1.

SUPER TUNER PLUS IN BASIC SYSTEM

DIAGRAM 1

Operation

1. Set tuner controls as follows:
   A. For 50 ohm settings see Chart A.

BASIC CONTROL SETTINGS
(into a 50 ohm resistive load)

BAND & FREQ.	TRANS.	INDUCTANCE	ANT.
160 - 1.830	1	L	2.5
75 - 3.8	3	E	4.0
40 - 7.2	5.5	C	6.0
20 - 14.2	4	B	1.0
15 - 21.3	3.5	B	3.0
10 - 28.6	8.25	A	8.0

CHART A

   B. For an unknown antenna system:
      160-40 meters - Transmitter and Antenna controls at 5 on respective scales. Inductance Selector to position A.
      20-10 meters - Transmitter and Antenna controls at 6 on respective scales. Inductance Selector to position A.

2. Turn the front panel sensitivity control fully clockwise.

3. Key your exciter and apply just enough RF power to cause a reading on the relative power meter and/or an SWR bridge-wattmeter.

4. Next, rotate the inductance selector for a minimum reading on the station VSWR meter, and/or a maximum reading on the front panel relative power output meter. Be sure to adjust the front panel sensitivity control as necessary.

5. Next tune the antenna matching and then the transmitter matching controls for minimum reading on the VSWR meter and/or a maximum reading on the front panel relative power output meter.

6. Remember that all three front panel tuning controls interact with each other, so readjust each one until you have reached an absolute minimum reading on your VSWR meter, and/or a maximum reading on the front panel relative power meter.

7. Apply full drive to your final amplifier and set the relative power meter to read full scale.

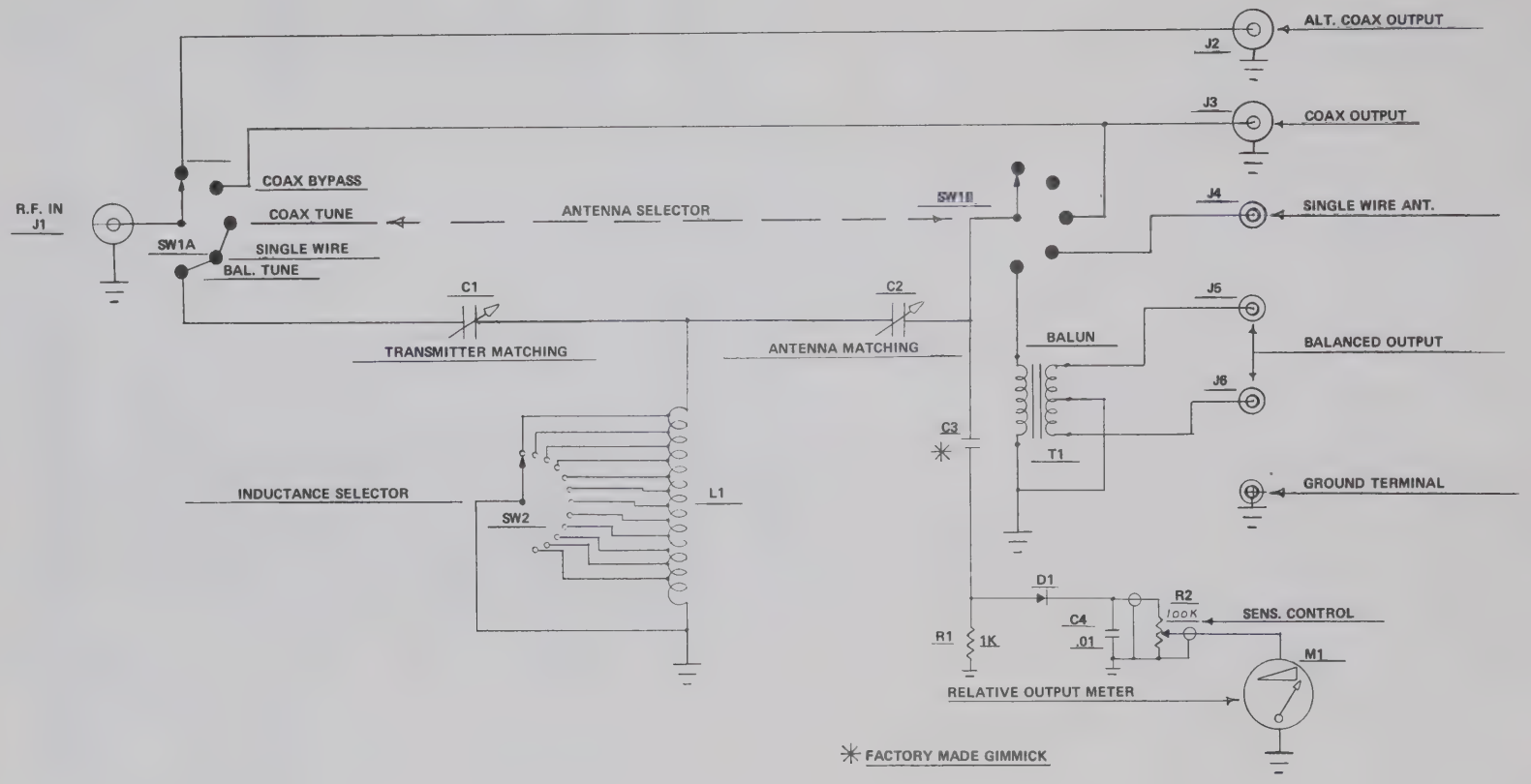
8. Unkey the exciter and set it to operate in the SSB mode. Your modulation can now be set correctly by observing the relative power meter. It should never go beyond 75% of full scale, or you will probably be flat topping, etc.

9. Once you've tuned up, make a record of each tuner setting per band. That will make for quick band changing.

10. After your VSWR meter is tuned to the lowest possible point leave your SWR bridge/power meter in the reflected position, and use the relative power output meter on the tuner to observe forward power

Super Tuner Plus Parts List

CAPACITORS:	
C1	500 Pf Variable
C2	500 Pf Variable
C3	Sensing Network
C4	.01 Disc. 1 KV
RESISTORS:	
R1	1K, ½W Carbon
R2	100K Pot
INDUCTORS:	
L1	Tapped Inductor
T1	4:1 Balun XFMR.
SWITCHES:	
SW1 A&B	5 Pos. DP ceramic SW.
SW2	12 Pos. SP ceramic SW.
CONNECTORS:	
J1, J2, J3	SO 239's
J4, J5, J6	Ceramic Feed thrus
MISC.:	
D1	1N6263
M1	0-1 MA MTR.



SCHEMATIC, SUPER TUNER PLUS

SCALE:	APPROVED BY	DRAWN BY W.C.A.
DATE: 5-12-78		REVISED

DENTRON RADIO

DRAWING NUMBER 4-007

DenTron

Limited Warranty

DenTron Radio is proud of the quality and workmanship of its communication equipment. If properly installed and operated in accordance with our instruction manual, it will give reliable performance. DenTron Radio extends to you as an owner of a new DenTron Radio Product the warranty set forth below:

For ninety (90) days from the date of original retail purchase, **DENTRON RADIO CO.** will either repair or replace, at its option, free of charge, any part or parts found to be defective in material or workmanship. Transportation charges for any parts submitted for replacement under this warranty must be paid by the purchaser.

This warranty will not apply to any part which has become inoperative due to misuse, excessive use, accident, neglect, improper maintenance, alterations, or unless the unit has been operated and maintained in accordance with the instructions furnished.

This warranty will not apply where the unit has been used commercially or when the unit has been used in conjunction with accessories not manufactured by **DENTRON RADIO CO.**

All implied warranties are limited in duration to ninety (90) days from the date of original retail purchase.

The provisions of this warranty specifically exclude any warranty or remedies for incidental or consequential damages.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATIONS OR EXCLUSIONS MAY NOT APPLY TO YOU.

In order to obtain warranty service, send written notification to the following address: **DENTRON RADIO CO.**, Attn: Service Dept., 2100 Enterprise Parkway, Twinsburg, Ohio 44087.

Any written notification should include the model number of the unit, date and place of purchase, and a description of the defective part or condition. Do not return the unit or any parts unless requested to do so by **DENTRON RADIO CO.**

Although the return of the DENTRON Warranty Registration Card is not a condition precedent to warranty coverage and performance, the purchaser is encouraged to promptly return the Warranty Registration Card upon purchase in order to more easily facilitate the handling of any future service under these warranty provisions.

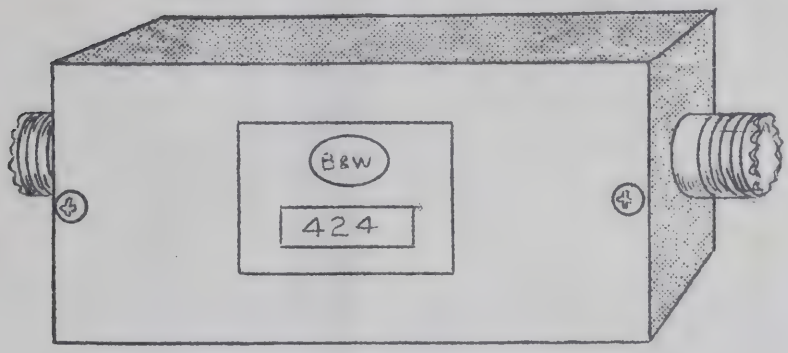
THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE TO STATE.

DenTron
Radio Co., Inc.

2100 Enterprise Parkway
Twinsburg, Ohio 44087
(216) 425-3173

MODEL 424 LOW PASS FILTER

FOR CITIZEN'S BAND & LOW POWER AMATEUR TRANSMITTING EQUIPMENT



The new B&W Model 424 Low Pass Filter has been designed to effectively reduce TVI. When properly installed in accordance with instructions furnished with each unit, radiated spurious and other undesirable signals, higher than 35 mc and related harmonics appearing in the TV and FM bands or other channels, are attenuated by at least 60 DB (A reduction of 1 million times). It may also be used between a low power exciter unit and a high power amplifier to reduce introduction of spurious frequencies to the grid circuit of the final.

The design consists of 3 sections using one "M" derived section on each end and a constant "K" section in the center. The unit is reversible, therefore either end will serve as the input or output. See reverse side of this sheet for typical installation ideas.

NOTE: Not recommended for use with transmitted frequencies higher than 30 MC.

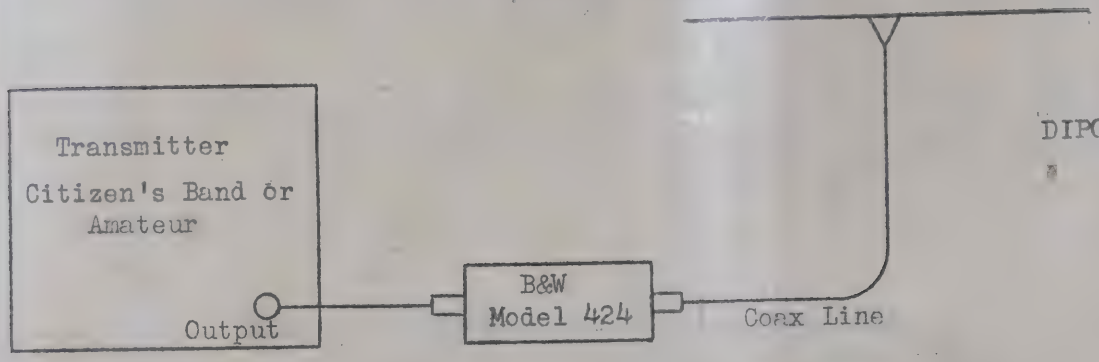
Specifications:

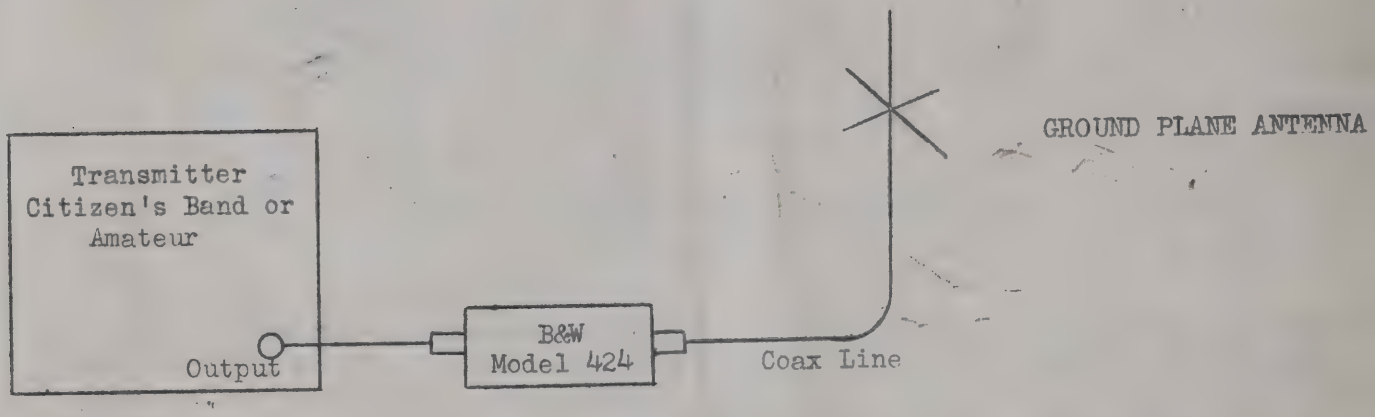
Power Rating -	100 Watts Max.
Frequency Range -	1.5 to 30 mc
Attenuation -	Min. of 60 D.B. from 35 MC throughout the TV and FM channels
Impedance -	52/75 ohms (Reversible)
Connectors -	Two UHF Type SO.2[illegible]
Size -	5" x 2" x 1-3/4"
Weight -	Net 7 oz. Shippi[illegible]s.

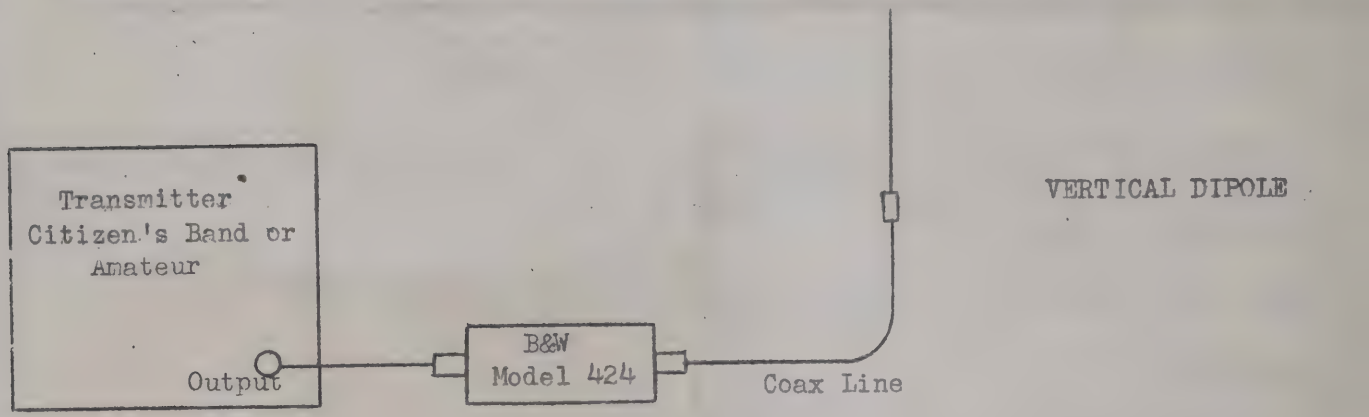
Price $8.[illegible]

Barker & Willi[illegible]c.
Bristol, Pe[illegible]a

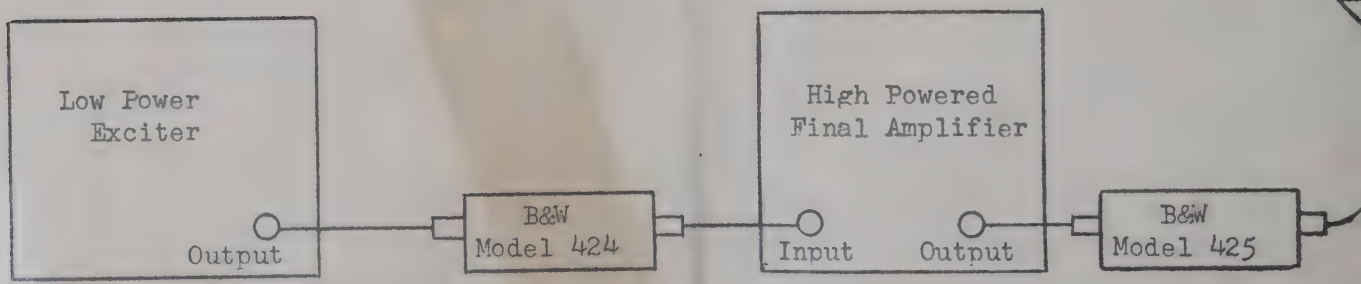
TYPICAL INSTALLATIONS







EXCITER - FINAL APPLICATION



GigaParts
www.gigaparts.com

Sales Order

PO Box 11367
Huntsville, AL 35814

(256) 535-4442

1426-B Paramount Dr.
Huntsville, AL 35806

Date	Order #
5/14/2014	14057065

Ship To

Terms	PO #	Sales Rep	Shipping Met...	Ship Date	Reference
		WEB	Saver Parcel (3-10	5/15/2014	196-14057065

Part Number	Description	Quantity	Units	Price	Tax	Ext. Amount
ZYS-FP-1030A	30A PS W/METERS	1	EA	229.00	Yes	229.00
ZGP-GIFT0100-H2	Ball Cap - Black, GigaParts/Yaesu	1	EA	4.99	Yes	4.99
Promo Code	Promotional Discount			-4.99	Yes	-4.99

	Subtotal	229.00
	Shipping Cost (Saver Parcel (3-10 Bus. days))	0.00
	Total	$229.00
Received/Accepted by:		

14057065

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untsville, AL 35814

(256) 535-4442

1426-B Paramount Dr.
Huntsville, AL 35806

Date	Order #
5/19/2014	14057524

[redacted]

Ship To

PETER MORIN

[redacted]

erms	PO #	Sales Rep	Shipping Met...	Ship Date	Reference
		WEB	Saver Parcel (3-10	5/28/2014	501-14057524

Part Number	Description	Quantity	Units	Price	Tax	Ext. Amount
836	~SWR/Ammeter, 1.8-30MHz, 3A/3kW	1	EA	129.95	Yes	129.95

	Subtotal	129.95
	Shipping Cost (Saver Parcel (3-10 Bus. days))	11.53
	Total	$141.48

ceived/Accepted by:

GigaParts
www.gigaparts.com

Sales Order

PO Box 11367
Huntsville, AL 35814

(256) 535-4442

1426-B Paramount Dr.
Huntsville, AL 35806

Date	Order #
5/14/2014	14057065

Ship To

Terms	PO #	Sales Rep	Shipping Met...	Ship Date	Reference
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Promo Code	Promotional Discount			-4.99	Yes	-4.99

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14057065

GigaParts
www.gigaparts.com

Sales Order

O Box 11367
untsville, AL 35814

(256) 535-4442

1426-B Paramount Dr.
Huntsville, AL 35806

Date	Order #
5/19/2014	14057524

Ship To

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		WEB	Saver Parcel (3-10	5/28/2014	501-14057524

Part Number	Description	Quantity	Units	Price	Tax	Ext. Amount
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	Subtotal	129.95
	Shipping Cost (Saver Parcel (3-10 Bus. days))	11.53
	Total	$141.48

ceived/Accepted by:

AMATEUR ELECTRONIC SUPPLY
28940 EUCLID AVE
WICKLIFFE OH 44092
Branch Store

LOCAL: 440-585-7388
TOLL FREE: 1-800-321-3594
FAX: 440-585-1024

** WEB ** WEB ORDER#: 37441
CE * PAGE 1
**** AMOR05

[redacted]

NG PA 19606-9797 READING PA 19606-9797

610-919-0131 WORK: FAX:
IL: wa9kws@arrl.net

VOICE #	INVOICE DATE	SHIP DATE	SHIP VIA	ORDER #	SALESPERSON
930-02	5/19/14	5/19/14	FIRST CLASS	2514361	MATTHEW W

BQTY	ID	ITEM NUMBER	ITEM DESCRIPTION	PRICE	EXTENDED
	RTS	ADMS-DX1200	RT SYS SOFT/USB CBL; FTDX1200	49.95	49.95

NKS FOR CHOOSING AES CLEVELAND. 73 DE MATT W8DEC. 1-800-321-3594.
FIRST CLASS MAIL ($3.86)
ON BACKORDER

ENT TYPE	AMOUNT	EXP
	53.81	

SUB-TOTAL	49.95
SHIPPING	3.86
INSURANCE	
COD/OTHER	
TAX	
INVOICE TOTAL	53.81

S MUST BE AUTHORIZED WITHIN 10 DAYS & SUBJECT TO MINIMUM 15% RESTOCKING FEE
ERVE THE RIGHT TO DEDUCT ACTUAL OUTBOUND FREIGHT ON RETURNS

adafruit

150 VARICK ST #3, NEW YORK, NY 10013

FOR SUPPORT: http://www.adafruit.com/support

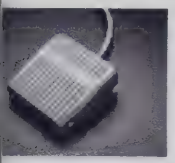
501814

VOICE NO. 501814

TE ORDERED: Saturday 17 May, 2014

YMENT METHOD: PayPal

9kws@arrl.net

ODUCTS	INFO	PRICE	TOTAL
 (1) Foot switch	PID: 423 SID: 4G.5	$7.50	$7.50

Sub-Total:	$7.50
Tax:	$0.00
United States Postal Service (0.64lbs) (First-Class Mail incl. $0.75 insurance): Shipping:	$5.51
Total:	$13.01

A delayed game is eventually good, a bad game is bad forever – Shigeru Miyamoto

CONSUMER PROFILE DATA

So that we can better serve your needs in the future, please complete the profile data below. Thank you.

1. How was this product purchased?

(01) ☐In-store (02) ☐Hamfest (Specify) (03) ☐Mail Order (04) ☐Other (Specify)

2. Why did you purchase this product?

(05) ☐Price (06) ☐Design (07) ☐Brand Name (08) ☐Reputation (09) ☐Features (Specify)

3. Influences to purchase this product?

(10) ☐Recommendation from another ham (11) ☐Advertising (12) ☐Magazine Product Review (13) ☐Salesperson (14) ☐Other (Specify)

4. Amateur Radio Magazines you read: (Check all that apply)

(15) ☐QST (16) ☐Popular Communications (17) ☐CQ (18) ☐Monitoring Times (19) ☐73 (20) ☐Worldradio (21) ☐Spanish CQ (22) ☐Other (Specify)

5. Primary Interests: (Check all that apply. Use "1" for Interested, "2" for Using)

	SSB	CW	FM	AM	RTTY	PACKET	ATV
1-30 MHz	(23)	(24)	(25)	(26)	(27)	(28)	(29)
50 MHz	(30)	(31)	(32)	(33)	(34)	(35)	(36)
144 MHz	(37)	(38)	(39)	(40)	(41)	(42)	(43)
220 MHz	(44)	(45)	(46)	(47)	(48)	(49)	(50)
440 MHz	(51)	(52)	(53)	(54)	(55)	(56)	(57)
1.2 GHz	(58)	(59)	(60)	(61)	(62)	(63)	(64)

6. Primary Frequencies used: (Check all that apply)

	BASE	MOBILE	HANDHELD
1-30 MHz	(65)	(66)	(67)
50 MHz	(68)	(69)	(70)
144 MHz	(71)	(72)	(73)
220 MHz	(74)	(75)	(76)
440 MHz	(77)	(78)	(79)
1.2 GHz	(80)	(81)	(82)
DUAL-BAND			
144/220 MHz	(83)	(84)	(85)
144/440 MHz	(86)	(87)	(88)
440/1.2 GHz	(89)	(90)	(91)
TRI-BAND			
144/220/1.2 GHz	(92)	(93)	(94)
144/440/1.2 GHz	(95)	(96)	(97)

7. Planned Purchases in the next 12/24 Months:

	HF	MOBILE	HANDHELD	$250	$500	$700	$1000+
1-30 MHz	(98)	(99)	(100)	(101)	(102)	(103)	(104)
50 MHz	(105)	(106)	(107)	(108)	(109)	(110)	(111)
144 MHz	(112)	(113)	(114)	(115)	(116)	(117)	(118)
220 MHz	(119)	(120)	(121)	(122)	(123)	(124)	(125)
440 MHz	(126)	(127)	(128)	(129)	(130)	(131)	(132)
1.2 GHz	(133)	(134)	(135)	(136)	(137)	(138)	(139)
DUAL-BAND	(140)	(141)	(142)	(143)	(144)	(145)	(146)
TRI-BAND	(147)	(148)	(149)	(150)	(151)	(152)	(153)

8. Equipment you currently own:

	Brand	Age
☐Receiver	(154)	(155)
☐Transmitter	(156)	(157)
☐VHF/UHF Handheld	(158)	(159)
☐VHF/UHF Transceiver	(160)	(161)
☐HF Transceiver	(162)	(163)
☐Beam Antenna	(164)	(165)
☐Antenna Rotator	(166)	(167)
☐RF Power Amplifier	(168)	(169)
☐Computer	(170)	(171)
☐Mobile Rig	(172)	(173)
☐Other	(174)	(175)

OWNERSHIP INFORMATION

Name (176)

Address (177)

City (178) **State** (179) **Zip Code** (180)

Age (181) **Sex** (182) **Occupation** (183)

Education (optional)

(184) ☐Grade 1-6 (188) ☐University
(185) ☐Grade 7-12 (189) ☐Graduate School
(186) ☐Jr. College (190) ☐Post Graduate
(187) ☐Other (Specify)

Annual Income (optional)

(191) ☐Less than $25,000 (194) ☐$75,000 to $99,000
(192) ☐$25,000 to $49,999 (195) ☐Over $100,000
(193) ☐$50,000 to $ 74,999

Call Sign (196) **License Class** (197) **Year First Licensed** (198)

PRODUCT REGISTRATION

Model Number (199) **Serial Number** (200)

Date Purchased (201)

Dealer Name (202)

Address (203)

City (204) **State** (205) **Zip Code** (206)

(Fold Here)

YAESU

Amateur Products Division of YAESU MUSEN

6125 Phyllis Drive, Cypress, California 90630, U.S.A.

Attn: Warranty Registration

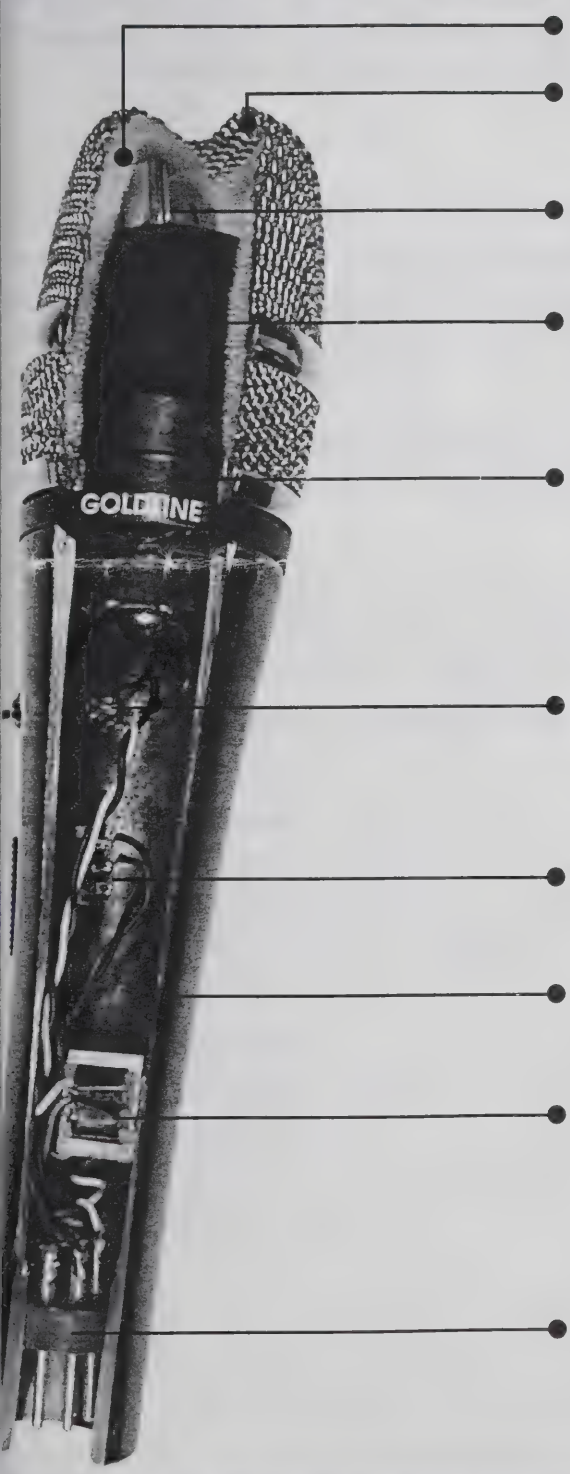
(Fold Here)

Tape
Do Not Staple

HEIL SOUND

GOLD LINE!

BROADCAST STUDIO MICROPHONE



- FOAM WINDSCREEN
- CRUSHPROOF GRILL
- HC "KEY ELEMENT" *(GM-4 - GM-5 Model only)*
- FULL RANGE STUDIO ELEMENT
- RUBBER SHOCK MOUNT
- ELEMENT SELECTOR SWITCH *(Passive EQ on Vintage Only)*
- "SOFT TOUCH" PTT MICROSWITCH
- DIE CAST ZINC HIGH GLOSS BODY
- HI-Z MATCHING TRANSFORMER *(Vintage Model Only)*
- 4 PIN XLR CONNECTOR

MODELS

- GM-4
- GM-5
- "VINTAGE" GOLDLINE

5800 North Illinois
Fairview Heights, IL 62208 USA
(618) 257-3000 Voice • (618) 257-3001 Fax
email: info@heilsound.com

DEFINING THE STANDARD FOR AMATEUR RADIO COMMUNICATIONS

GOLDLINE STUDIO MICROPHONES are professional quality dynamic microphones developed for broadcast and sou reinforcement applications which require flat response over a very wide frequency range. The GOLDLINE element ha smooth rise in the midrange voice frequencies which gives the microphone a very clear articulate response. The GOLDLI microphone is also offered for amateur radio applications as it's wide frequency range and +4 dB midrange boost centere 2,000 Hz. boost provides the perfect match for full range 'Hi-Fi' SSB, AM or FM transmission.

In addition to the full range dynamic element, two models of the GOLDLINE are available where maximum articulation of transmitted signal become necessary. A small selector switch selects either the full range studio element or one of the H 'Key Element' cartridges. The GOLDLINE GM-5 is equipped with the full range studio element and a Heil HC-5, The GOLDLI model GM-4 is equipped with the full range studio element and a Heil HC-4 "Dx Dream Machine" element.

ARCHITECT AND ENGINEER SPECIFICATIONS

The GOLDLINE studio microphone is a cardiod type full range element with an internal foam windscreen built into protective screen. The full range element exhibits a wide range response 40 Hz - 16,000 Hz. Two models are available w a second element that can be selected with a small bat handle switch. The GM-5 includes the Heil "Key Element" HC-5. T GM-4 includes the Heil 'Key Element' HC-4.

A third GOLDLINE microphone is called the GOLDLINE 'VINTAGE'. It includes just the full range studio microphone elem and a special low to high-Z matching transformer built into the body of the microphone. This model is designed specifically use with high impedance inputs of the older 'vintage' transmitters.

In the 'WIDE' position of the GM-5, the wide full range studio element is selected. The 'NARROW' position selects the H 'Key Element'. In the GM-4 model, the 'WIDE' position selects the wide full range studio element. The 'NARROW' posit selects the HC-4. The selector switch in the GOLDLINE 'VINTAGE' selects a passive equalization circuit which will roll (reduce) the last octave and one half of low end audio response so necessary in matching the tonal response of the mic phone to the high impedance inputs.

The wide frequency response of the GOLDLINE studio cartridge exhibits an excellent cardiod pattern. Four equally pla ports sense audio from behind the microphone and enter them out of phase thus producing a very linear cardiod patte This cartridge is shock mounted in a tightly fitted rubber mounting to help reduce handling noise. A 'soft touch' microswitc recessed into the body and be accessible onto pins 3 and 4 of the XLR connector to operate virtually any push-to- transmitter connection.

The output impedance of the wide full range GOLDLINE element is 600 ohms measured @ 1kHz. The sensitivity can be at -72dB (+) or (-) 2 dB measured at 1 kHz. The frequency response will be set at 40 Hz - 16 kHz. The steel body of microphone is a zinc die-cast body with a high lustre black lacquer finish.

The output terminates into a 4 pin XLR broadcast connector.
Pin 1 is Shield & Gnd. Pin 2 is audio. Pins 3 & 4 is PTT.

DSP SETTINGS FOR HEIL GOLDLINE MICPHONE

When using the GOLDLINE studio microphone with many of today's transceivers equipped with Digital Signal Processing, it is so important to adjust the DSP for maximum transmit audio quality. We present a few starting points for several of the more popular radios. NEVER make any adjustments or evaluations of your transmitted audio by listening to the transceiver 'monitor' circuit. The BEST way to evaluate your signal is to listen to a nearby receiver connected to a pair of quality headset such as our PRO-SET. Only then will you know EXACTLY how you sound to the outside world.

YAESU 1000 MP
Menu 4-4 Tredsp 3
Menu 5-9 TFIL 6
Menu 7-7 SSBT 100 – 3100
Menu 8 – 9 TLSB -200
PROCLSB .08 + .06
TUSB -200
PROCUSB .08 + .06

YAESU FT 100
Menu 25 Mic Gain 85
Menu 16 Mic EQ 3
Menu 64 Carrier shift +.05 to -.05
Menu 65 Carrier shift +05 to -.05
Menu 27 Compressor level 80

64 and 65 carrier point VERY important

KENWOOD 950 SDX
Menu #20 DSP T hpf -100
Menu #21 DESP T LPF -3100

KENWOOD 570
Menu 13 Bandwidth 2.4 K high 300 low
Menu 14 Transmit EQ High Boost Hb
Microphone Gain default level is 50
No Speech Processor

KENWOOD 870
Menu 29 Bandwidth 3000
Menu 30 Bandshift 100 or 0 (experiment)
Menu 31 Equalizer H or C (experiment)
Menu 22 Mic AGC start at 1 (try 0 and 2)
No Speech Processor

KENWOOD TS-2000
Menu 22 Bandwidth 3000
Menu 21 Equalizer H or C (experiment)
Menu 20 RCV EQ C or OFF (experiment)
Microphone gain default level is 50
No Speech Processor

YAESU 920

U 51 - 3
U 59 - 280
U 60 - 120

ICOM 746

Menu M1 – F4 TCN + 10dB
Processor ON Real Panel control set at 1 o'clock
Mic Gain 2 O'clock

ICOM 756 PRO

Bass - 3 dB
Treble + 5 dB
Split Band Compressor WIDE or MID

With all ICOM rigs when using the GOLDLINE dynamic elements, you will Need to use the compressor at a low level which actually acts as a mic preamp. Mic Gain will adjust to about 3 /4 open. Nothing will be overdriven. It will Sound beautiful.

Kachina 505 DSP

BPF 3.5 or 4.1 kHz
TX EQ + 10 dB
Mic Gain 50 %

Our thanks for these settings to:

- W5GI
- KK7AC
- K1OU
- NN3T
- VE3SOU

SPECIFICATIONS

Element:
Dynamic

Frequency Response:
40 Hz - 16,000 Hz

Impedance:
600 ohms

Sensitivity:
- 72 dB @ 1,000 Hz

Polar Pattern:
Cardiod

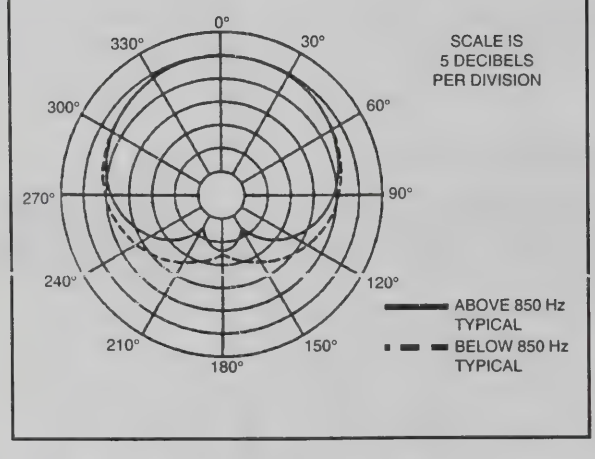
Finish:
High Gloss Black Lacquer

Weight:
14 ounces

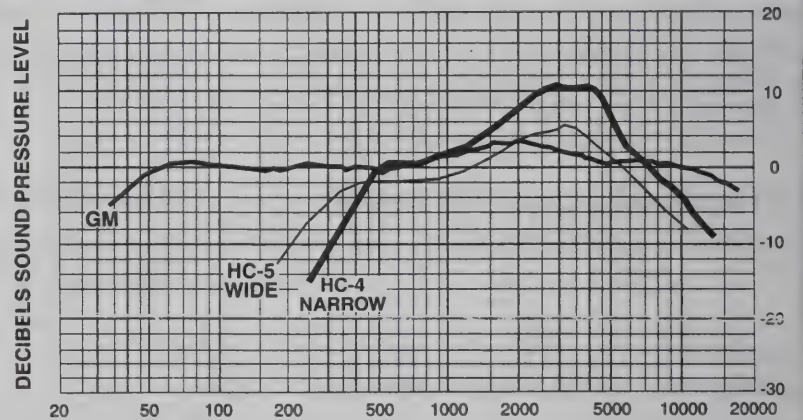
Accessories Furnished:
- 5/8 - 27 threaded mic clip
- Vinyl carrying bag
- Specification/instruction sheet

Optional Accessories:
- SM-1 Shock Mount
- FS-1 Foot Switch
- CC-1 Connecting Cable
- LX-1 Microphone Boom

POLAR RESPONSE



FREQUENCY RESPONSE GOLDLINE RESPONSE



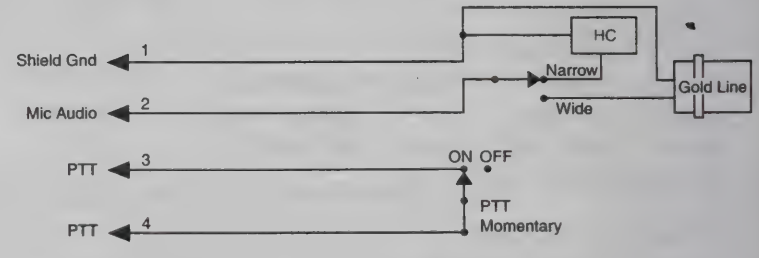
LIMITED WARRANTY

Heil Sound, Ltd. warrants this product to the original retail purchaser for a period of one (1) year for the parts and ninety (90) days for any labor from the date of purchase. It does not cover the accidental or incidental damages to the microphone. It does not cover the exterior finishes or appearances of the microphone due to use, wear or damage.

Heil Sound Ltd. will repair or replace at its option, the defective product. Proof of purchase receipt is required to honor any and all parts of this warranty.

Heil Sound Ltd. shall not be responsible for any loss, damages or expenses whether direct, consequential or incidental that arise from the use of or inability to use this product. Some states do not allow limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

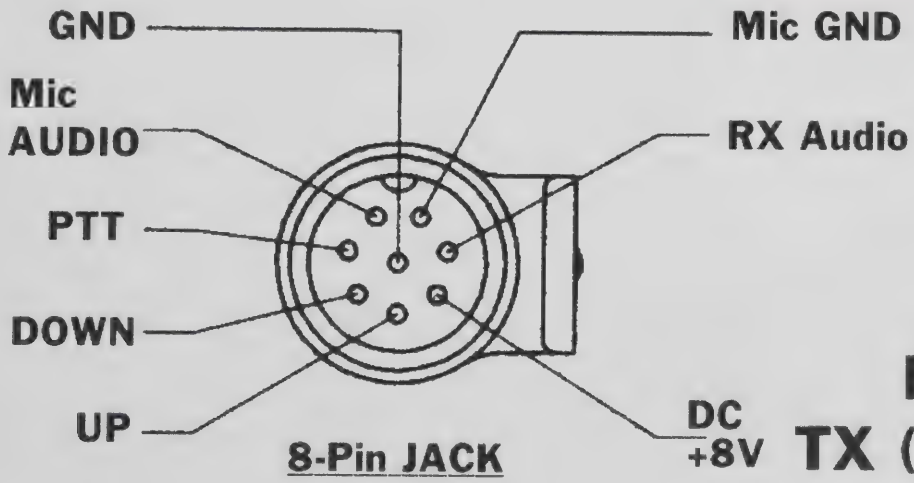
WIRING DIAGRAM



5800 North Illinois
Fairview Heights, IL 62208 USA
(618) 257-3000 Voice • (618) 257-3001 Fa
email: info@heilsound.com

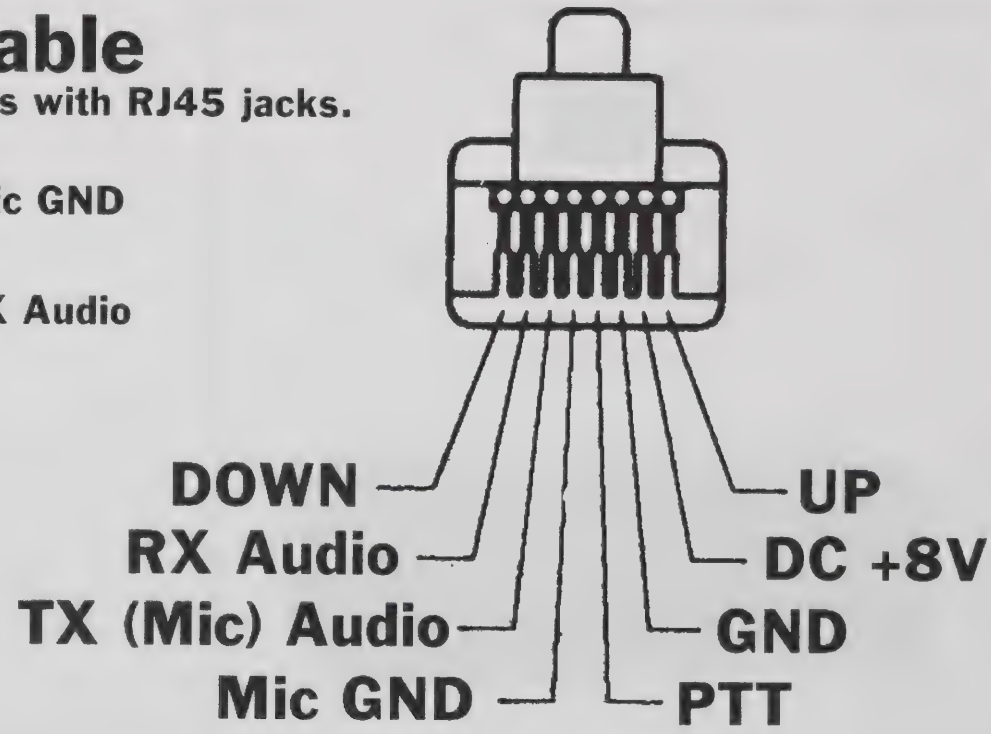
Kenwood MJ-88 Cable

Adapts mics with round plugs to radios with RJ45 jacks.



8-Pin JACK

FRONT VIEW Of Connectors On Cable
(Soldering End of Matching Connectors)



RJ-45 PLUG

Mike audio = white
Mike ground = shield

MFJ

VHF/UHF Dual Band Tuner™

Model MFJ-923

INSTRUCTION MANUAL

CAUTION: Read All Instructions Before Operating Equipment

MFJ ENTERPRISES, INC.
300 Industrial Park Road
Starkville, MS 39759 USA
Tel: 662-323-5869 Fax: 662-323-6551

VERSION 1A

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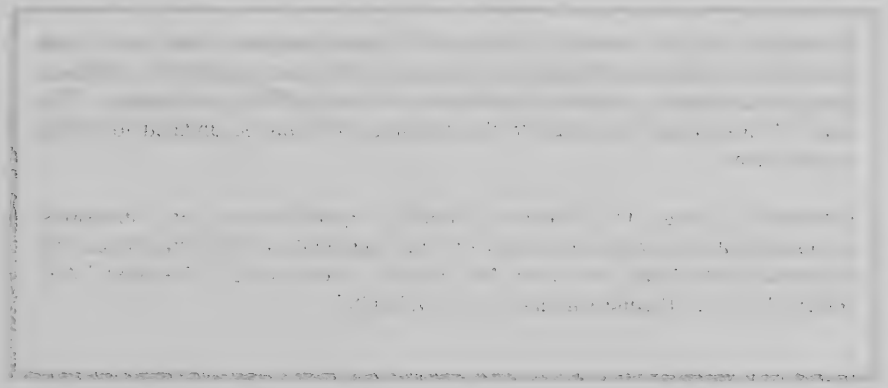
DISCLAIMER

Information in this manual is designed for **user purposes only** and is ***not*** intended to supersede information contained in customer regulations, technical manuals/documents, positional handbooks, or other official publications. The copy of this manual provided to the customer will ***not*** be updated to reflect current data.

Customers using this manual should report errors or omissions, recommendations for improvements, or other comments to MFJ Enterprises, 300 Industrial Park Road, Starkville, MS 39759. Phone: (662) 323-5869; FAX: (662) 323-6551. Business hours: M-F 8-4:30 CST.



INTRODUCTION

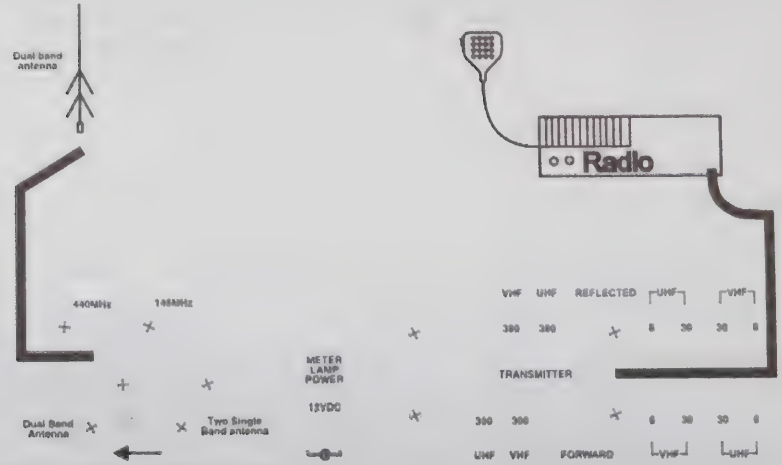
The MFJ-923 Antenna Tuner was designed with today's dual band radios in mind. This unit has a single input connector so that it will easily connect to your dual band transceiver. Two output connectors give you the option of using a dual band antenna or two single band antennas for maximum performance. A switch on the back of the unit allows you to select two single or one dual band antenna. This option eliminates the need for a duplexer when operating two antennas with one radio. The built in power meter has three selectable power settings for each band.

INSTALLATION

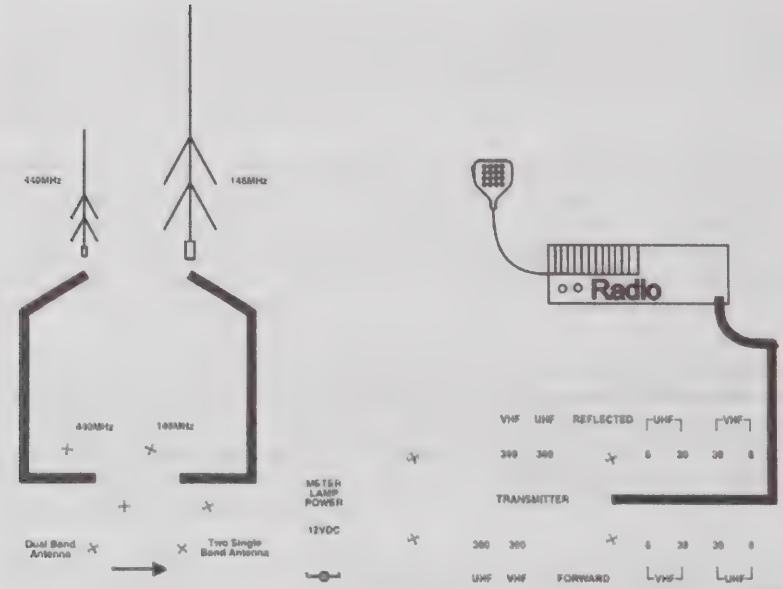
The MFJ-923 should be installed between the transmitter and antenna.

1. Locate the tuner in a convenient location at the operating position.
2. Use a 50 ohm coaxial cable to connect the transmitter or transceiver to the SO-239 labeled TRANSMITTER on the back of the tuner.
3. Connect an antenna feed to the appropriate tuner output:

   (A) If using a dual band antenna then select either of the output connectors. When the output switch is in the dual band position, both connectors are the same and either will work. Only use one of the connectors, do not connect anything else to the other. Leave it open.



(B) If using two single band antennas, connect the two meter antenna to the connector marked 146MHz. Connect the 440 antenna to the connector labled 440MHz. Move the switch to "two single band"



4. Connect the power jack on the back of the unit to a 12VDC power supply using the supplied power connector. Connect your tuner and transmitter to a good earth ground.

OPERATION

This antenna tuner operates slightly different than most manual tuners do. You will notice that there are five tuning knobs on the front of the unit and one switch for the power level and band selection.

The band selection and power switch simply adjust the sensitivity of the watt meter to the correct frequency and power level indicated on the dial. It has no affect on the tuning of the load. Simply select which band you want to tune and the power level you will be using.

Tuning the two meter band is accomplished by adjusting the two knobs on the top row as indicated by the 144-148 range. This operation is very similar to tuning a normal T-match tuner. Adjust each knob for lowest reflected power reading. After making adjustments to one knob, readjust the other and then go back to the original and adjust it again. Do this back and forth method until a suitable SWR has been obtained.

Tuning the 440 side of the tuner is much the same as the two meter side with the addition of another knob. The three knobs across the bottom of the unit are used for tuning the 440 band. To do this, use the same method as tuning the two meter side. Go back and forth to each knob until a suitable SWR is obtained. The additional knob will make it a little more difficult but it will only take a little more experimentation and time.

This tuner is designed to match dual band or single band antennas in the two meter and 440 bands. Very large SWR values may not be able to be corrected by the tuner and indicate a severe problem in the antenna or feedline system.

TECHNICAL ASSISTANCE

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or your problem is not solved by reading the manual you may call *MFJ Technical Service* at **662-323-0549** or the *MFJ Factory* at **662-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.
You can also send questions by mail to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759; by Facsimile to 662-323-6551; or by email to techinfo@mfjenterprises.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

NOTES:

FULL 12 MONTH WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free from defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, canceled check, credit card or money order receipt, etc.) describing the product to establish the validity of the warranty claim and submit the original of machine reproduction or such proof of purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery shall be cause to void any and all warranty terms immediately.

2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product under warrantee provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashiers check, or money order for **$7.00** covering postage and handling.

3. MFJ Enterprises, Inc. will supply replacement parts free of charge for any MFJ product under warranty upon request. A dated proof of purchase and a **$5.00** personal check, cashiers check, or money order must be provided to cover postage and handling.

4. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling (601) 323-5869.

5. This warranty does not apply to kits sold by or manufactured by MFJ Enterprises, Inc.

6. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board product is returned.** Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, or cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.

7. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ products.

8. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.

9. This warranty is given in lieu of any other warranty expressed or implied.

10. MFJ Enterprises, Inc. reserves the right to make changes or improvements in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.

11. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to **MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, Mississippi 39759, USA** and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.

12. This warranty gives you specific rights, and you may also have other rights which vary from state to state.

MFJ

MFJ ENTERPRISES, INC.
300 Industrial Park Road
Starkville, MS 39759

MFJ-923 Manual
Version 1A
Printed In U.S.A.

MFJ-817C Deluxe VHF/UHF True Peak Reading SWR/Wattmeter

Introduction

The MFJ-817C is a true peak reading SWR/Wattmeter designed to operate on 144/220/440 MHz. This meter uses our *TrueActive™* peak reading circuit to read true peak/average forward and reflected power and SWR simultaneously. It has 300/30 Watts forward and 60/6 Watts reflected power scales. The MFJ-817C utilizes a large illuminated three-inch Cross-Needle meter to read the SWR from 1:1 to ∞.

IMPORTANT:

Please read entire manual before attempting to operate this equipment. This unit does not provide a dc or low frequency earth ground. A separate wire should be connected from the station ground bus to an electric ground. Do not place any non-coaxial feed wires near metallic or RF sensitive devices.

Installation

1. Connect your transmitter to the connector on the back of the unit labeled TRANSMITTER and your antenna to the connector labeled ANTENNA. It is important that you use good quality coax and properly installed connectors.

2. The MFJ-817C has a *TrueActive™* peak reading circuit that requires a DC power supply such as the MFJ-1312B in order to function. A 9 VDC may also be installed inside the meter with a battery clip that is included. The rear panel accepts a 2.1 mm coaxial plug with the center conductor positive (+) and the sleeve negative (-). The negative lead is grounded inside the meter. There is no need to disconnect the battery when using external power.

3. An internal lamp backlights the meter scale. The lamp circuit requires 12 VDC and will not illuminate with the 9 VDC battery alone.

4. To measure the power output capability of a transmitter/amplifier you should connect a quality 50-ohm dummy load to the ANTENNA connector of the MFJ-817C.

NOTE:
The wattmeter must have a power source in order to function. A nine-volt battery may be installed in the compartment on the rear panel, or an external 12 VDC source, such as the optional MFJ-1312D power supply, may be used.

Operation

1. With the DC power supply or 9 VDC battery installed, push the **ON/OFF** button **in** to turn the unit ON. If 12 VDC is used, the lamp will also be turned ON.

2. The meter's full-scale forward and reflected power range is controlled by the **300/30 Watt** button. When the button is pushed **in**, the forward power scale is on 300 Watts and the reflected power scale is on 60 Watts. When the button is pushed **out**, the forward power scale is on 30 Watts and the reflected power scale is on 6 Watts. If your transmitter/amplifier runs more than 30 Watts of output power, push the button **in** for 300 Watts. If your transmitter runs less than 30 Watts of output power, push the button **out** for 30 Watts.

3. Average power is measured when the **PEAK/AVG** button is pushed **out.** Peak envelope power (PEP) is measured when the **PEAK/AVG** button is pushed **in**. Peak and average power values are equal with steady unmodulated carriers, FSK, or FM. The meter reading on these modes will be the same whether the **PEAK/AVG** button is pushed **in** or **out.** On SSB, the PEP meter reading should be twice the average power with two-tone test modulation. On SSB, the ratio of PEP to average power varies with different voice characteristics. With most voices, the PEP reading is three to five times higher than the average voice power reading. The most accurate PEP readings are obtained only with sustained carrier, voice or two-tone test modulation. During normal voice modulation, the wattmeter will typically indicate only 70% of the true Peak Envelope Power.

4. Forward power is displayed on the left-hand FORWARD meter scale. This scale is calibrated from 0 to 300 Watts and is read directly in the **300W (in)** position. Each picket (scale mark) represents 5 Watts below 10 Watts, 10 Watts between 10 and 100 Watts, and 25 Watts between 100 and 300 Watts. In the **30W (out)** position, the forward power scale must be divided by 10. Each picket represents 0.5 Watts below 1 watt, 1 watt from 1 to 10 Watts, and 2.5 Watts from 10 to 30 Watts.

5. The reflected power is read on the right-hand REFLECTED meter scale. Reflected power is 60 Watts full scale when the **300W (in)** power scale is selected, and 6 Watts full scale when the **30W (out)** power scale is selected.

6. The most accurate power readings occur in the upper half of the meter scales. When trying to measure power with a less than perfect match, the reflected power should be subtracted from the forward power reading in order to find the true power.

7. The SWR is read directly from nine red SWR curves that range from 1:1 to ∞. SWR is measured by observing the point where the forward and reflected power needles cross. The SWR is indicated by the red curve closest to the needle crossing point.

Calibration

The MFJ-817C has been calibrated at the factory. If it should ever need to be recalibrated, then follow this procedure:

Equipment Needed

1. Transmitter capable of supplying enough power to obtain ½ to full-scale reading at 144/220/440 MHz.

2. 50-ohm dummy load that is capable of handling full transmitter output power and has better than a 1.15:1 SWR at 144/220/440 MHz.

3. Power meter of know accuracy. The calibration will only be as good as the standard reference meter.

4. 50-ohm cables capable of handling the power. RG-58/u is recommended. DO NOT USE RG-59 or RG-11.

Meter Calibration

1. Refer to *Figure 1* for the Test Setup and refer to the PCB layout in *Figure 2* for trim pot location.

2. Remove the top of the MFJ-817C.

3. Connect the Test Setup equipment as shown in *Figure 1*. Use a 50-ohm dummy load for the antenna. Set the Transmitter to the 144/220/440 MHz in the VHF/UHF band.

4. With the **300/30 Watts** button pushed **in** for the 300 Watt scale, Transmit 100 Watts as indicated on the reference meter. Adjust the HI FWD trim pot to set the forward power scale to 100 Watts.

5. With the **300/30 Watts** button pushed **out** for the 30 Watt scale, Transmit 10 Watts as indicated on the reference meter. Adjust the LO FWD trim pot to set the forward power scale to 10 Watts.

6. To set the reflected power, interchange the TRANSMITTER and ANTENNA coax cables so that the transmitter is connected to the ANTENNA connector and the dummy load is connected to the TRANSMITTER connector.

7. With the **300/30 Watts** button pushed **in** for the 60 Watt reflected scale, Transmit 10 Watts as indicated on the reference meter. Adjust the HI REF trim pot to set the reflected power scale to 10 Watts.

Meter Calibration (cont.)

8. With the **300/30 Watts** button pushed **out** for the 6 Watt reflected scale, Transmit 1 Watt as indicated on the reference meter. Adjust the LO REF trim pot to set the reflected power scale to 1 Watt.

9. SWR requires no calibration.

10. Repeat each calibration for each frequency if needed until the meter has the correct readings on each frequency.

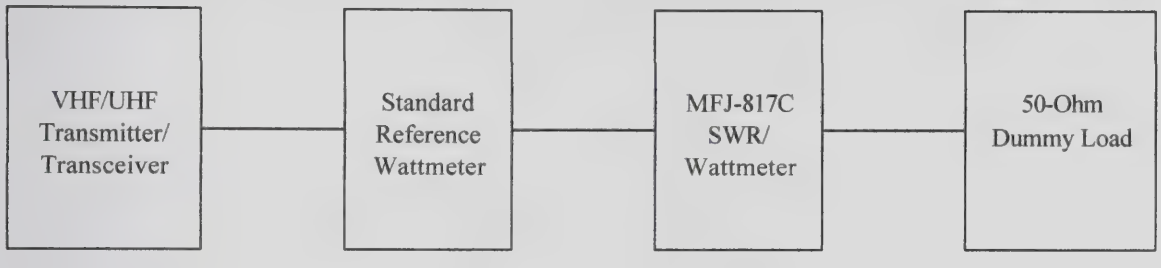


***Figure 1**: Test Setup*

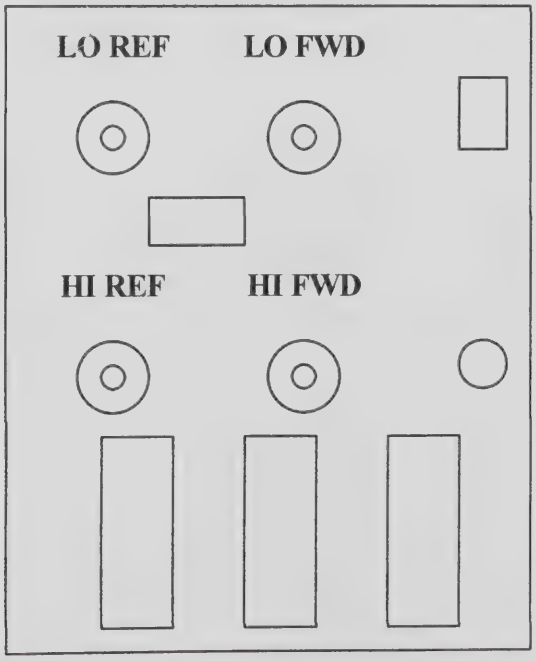


***Figure 2**: PCB Layout and Trim Pot Location*

Technical Assistance

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or reading the manual does not solve your problem, you may call *MFJ Technical Service* at **662-323-0549** or the *MFJ Factory* at **662-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759; by Facsimile (FAX) to 662-323-6551; or by email to techinfo@mfjenterprises.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

Ship To:

Order ID: 111-2036564-7443462

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Order Date:	Jan 6, 2016
Shipping Service:	Standard
Buyer Name:	Peter Morin
Seller Name:	Hamcity com

Quantity	Product Details	Price	Total
1	**MFJ Enterprises Original MFJ-817C Deluxe VHF/UHF True Peak 144/220/440 MHz Cross Needle SWR / Power Meter** **SKU:** MFJ-817C **ASIN:** B00S1TE7V0 **Listing ID:** 0109PHB75G3 **Order Item ID:** 14625120148482 **Condition:** New **Comments:** Brand New Original MFJ - Authorized USA Dealer for 25 Years and Largest Independent MFJ Enterprises Dealer.	$94.95	Subtotal: $94.95 Total: $94.95
			ORDER TOTAL: $94.95

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